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THE SCOTTISH GEOGRAPHICAL MAGAZINE

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JOHN HORNE, LL.D., F.R.S., P.R.S.E., HON. EDITOR
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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE PROBLEM OF THE SOUTH SLAVS (YUGOSLAVS).

By MARION I. NEWBIGIN, D.Sc. (Lond.).

(*With Illustrations.*)

IN the last issue we devoted a considerable amount of space to Dalmatia, whose problem is but an aspect of the wider one presented by the South Slavs generally. In view of the complexity of this wider problem, and of its importance at the moment, it may be useful to give to it some special consideration. The recent publication of a valuable book [1] by Professor Jovan Cvijić, of the University of Belgrade, which is illustrated by a very fine series of maps, and by some interesting sketches, one of which we reproduce here, affords a convenient opportunity for doing this.

Professor Cvijić's book, which is devoted to the human geography of the region, discusses both in broad outline the physical geography of the peninsula as a whole, and, in much detail, the mental and moral characters of the various branches of the Yugoslavs, including both those which dwell within the Balkan region, and those found beyond its limits to the north and north-west. We shall not attempt here to review the volume in the ordinary sense, but shall rather use it as a text for a brief discussion of the general problem.

Before doing this, however, we must express the gratitude of geographers to the author for a book which both collects in a convenient form much material which has hitherto had to be sought in a number

[1] *La Péninsule Balkanique: Géographie Humaine*, by Professor Jovan Cvijić, Professeur à l'Université de Belgrade, Agrée à l'Université de Paris. Avec 31 cartes et croquis dans le texte et 9 cartes hors texte. Paris: Armand Colin, 1918. Price 17 fr. and 20 per cent. increase.

of scattered publications, and adds to it a great mass of information which has either not been published previously at all, or has not been available in a western language. Nor should we omit the special tribute of admiration which is so justly Professor Cvijić's due. Part of the results of many years' patient work had to be left behind in Serbia, and has quite possibly met the fate of the library of Louvain; the book was written and passed for the press at a time when the prospects of the rebuilding of Serbia, and much more the founding of a future Yugoslavia, seemed remote and uncertain: it was written also in exile and in a foreign language. Notwithstanding it is remarkably dispassionate and free from bitterness, and displays throughout a sober confidence in the future, which, in view of all the circumstances, one may legitimately describe as heroic.

It is not necessary to give a general account of the geography of the peninsula. In various articles published here in the earlier part of the war, notably in that which, accompanied by a coloured orographical map and sketch-maps, appeared in the issue for June 1915, the main features have been already summarised. The important point in connection with human geography which results from the structural characters of the area is, as is acutely observed by Professor Cvijić, that, as compared with western and central Europe, it is characterised by a want of continuity of civilisation. States have risen, grown to strength and apparent stability, and have fallen, leaving behind chaos from the point of view of administration, insecurity from that of the individuals. Nor, when new States have arisen in their turn, can they be said to have grown out of the old ones: sharp breaks in social and political evolution have been characteristic, and associated with this, primitive types of organisation and social polity have reappeared after periods of replacement by more specialised forms.

Historically, this peculiarity has, of course, been due to the successive invasions of the peninsula by alien groups. But geographically those invasions have been rendered possible by its peculiarities of relief.

Let us note the essential points in regard to this. To sum them up Professor Cvijić uses four words—entrance into the peninsula has, he says, been facilitated by its characters of union and of penetration; but combination within has been prevented by its characters of isolation and separation. In other words, the peninsula is not clearly demarcated from the surrounding areas, and, up to a certain point, penetration into it from these is easy. But the lines of penetration lead through it rather than to its separate parts, and as invaders progress inwards their lines of advance tend to converge on a very few main highways. These highways, again, do not pass through all the areas capable of supporting a fairly dense population, and cross connections are few.

This means that groups at least of the previously existing inhabitants can always find opportunity to evade the control of incomers, but it is as difficult for them to combine against the latter, as it is for

these to include the whole area in one single State. Even the Turk in the days of his military glory never succeeded in doing this in practice, whatever the theoretical limits of his domains.

Always then throughout its history the peninsula has been subjected to invading forces, tending inevitably to sweep through it to descend either upon Constantinople or Salonika, the great focal points. Always the invader has been constrained to leave minor focal points in the possession of earlier inhabitants. Always again these peoples, secure in their isolation, and yet capable of communicating with groups outside the peninsula, have gathered strength enough at least to emerge on the highways, and cause the dominant power to retreat to a greater or less extent. But the further step, the merging of old and new into a stable, composite community, the phenomenon with which we are so familiar in the west, has here only taken place on a small scale. It is commoner to find the defeated party merely retreating, sometimes after a lapse of time again to advance. It is in this peculiarity that we find the root of the peninsula's problems.

From these general statements let us pass to a few details. It is a commonplace that, in contrast alike to the Iberian and Italian peninsulas, the Balkan one has no natural northern frontier. That frontier is usually given as the Danube-Save line to the junction of the Kulpa with the latter river, extending thereafter from the Kulpa to the vicinity of Fiume. Professor Cvijić does not accept this limit, and would carry the line to the headwaters of the Save, and then to the sea by the Isonzo. The question, for our purpose, is of minor significance; the essential point is that from the Iron Gates of the Danube westward the peninsula is widely open to the north. The river frontier offers no impenetrable barrier to migration, and, even more important, no sharp distinction of surface, climate, or products separates the Balkan area within from Central Europe without. The same kind of people dwell on both banks of the Save-Danube; throughout history there have been constant movements of peoples backward and forward. Here, indeed, the Balkan area forms but a part of Central Europe.

Further east, in the region of the Dobruja, and, if less markedly, also along the Balkan shores of the Black Sea, there is continuity, despite the Danube and its swamps, with eastern continental Europe. Here again the river forms no natural nor ethnographical barrier, here again the human tide has ebbed and flowed without regard to the map-maker's frontier line.

Farther south only the sunk river valleys of the Bosporus and Dardanelles separate the peninsula from Asia Minor, and the geographer's distinction between the European and Asiatic "continents" has had no practical significance in history. At first sight it may appear that the prolongation of the peninsula which forms Greece is more or less remote and aloof, but in point of fact the island-studded Ægean is a bond of union rather than of separation. The same type of surface, the same products, the same mode of life, the same peoples, are repeated on the European and the Asiatic sides of that sea, and historically Greece has always belonged rather to Asia Minor than to the Balkan peninsula

proper. Further, within the peninsula, no less than in Asia Minor, the coastal belt, with its characteristically Mediterranean type of civilisation, passes, somewhat rapidly, into a steppe area, which may in places practically reach the sea. The pastoral peoples of Asia Minor, therefore, find, across the narrow belts of water, the type of relief and climate to which they are accustomed at home.

Finally, on the west, only the narrow Adriatic, constricted at the Strait of Otranto, separates the Balkan peninsula from the Italian one, and the island chain of Dalmatia, no less than the form of its mainland coast, has facilitated communication, led, in a sense, to a repetition of the conditions which prevail round the Ægean.

Let us look next at some historical facts in their relation to these geographical conditions. Broadly speaking, it may be said that the great incursions of alien peoples into the peninsula from the surrounding areas have been of two main types:—(1) the infiltration of groups finding within it the conditions to which they have been accustomed outside its limits, and capable therefore of establishing themselves as self-supporting groups; (2) forcible penetration by armed bodies desirous of grasping and holding the main highways and the focal points. The latter groups have always tended to seek to maintain themselves by the exploitation of the region and its inhabitants, rather than by adapting themselves to the natural conditions.

Without attempting a precise classification of the different groups of invaders under these two headings, let us next summarise briefly the essential points as regards the history of the peninsula.

Roman occupation begins with the Illyrian campaign of 229 B.C., but was slow, for Macedonia was not occupied till 146 B.C. Throughout, Roman penetration and control took place along the transverse lines of communication, the lines which have been of least importance in modern times, and this had an important bearing on the nature of the control exercised. The western coast, the region of entrance, was thoroughly Latinised, and in Dalmatia Latin—or at least Italian—influences have prevailed, through the period of Venetian domination, down to the present day (cf. the illustration of Trau). But in much of this region the relief, especially the proximity of the Dinaric Alps to the sea, limited the inward extension of the penetration.

Further north the Save-Danube area could be reached easily from the Adriatic coast, and Latin civilisation penetrated far to the east. Later, the continuity of the Romanised belt was broken by the Slav invasions, but the traditions of Rumania to this day bear witness alike to its strength and to its extension.

South of Dalmatia, especially in the region of Albania, penetration into the interior of the peninsula is again relatively easy from the coast, and the original inhabitants were profoundly influenced by Latin civilisation. Very important here is the transverse line of the Via Egnatia, leading direct, if through a difficult country, to the north coast of the Ægean and so to Constantinople (Byzantium) by Salonika. Here penetration was intense and persistent, and with the formation of the Eastern and Western Empires the south-eastern part of the peninsula

became profoundly stamped with that particular type of civilisation to which the name of Byzantine is given.

Had there been no barbarian invasions from the north, says Professor

One of the gates of Trau, with the Campanile of the Cathedral in the background. The lion over the gate is a memorial of the Venetian Conquest. (*From "Dalmatia," by Maude M. Holbach.*)

Cvijić, it seems certain that the northern part of the peninsula would have become Latin and the southern Greek (Byzantine). But those invasions, as already stated, cut the zone of Latin influence into two

parts, the eastern or Dacian becoming Rumania, while the western is represented, despite all subsequent changes, both in Dalmatia and in Albania.

Of the barbarian invasions those of permanent importance for the peninsula were the Slav immigrations towards the end of the sixth century, and the Ugro-Finnish ones of the latter part of the seventh century.

Of the Slavs relatively little seems to be known. They apparently originated in the regions beyond the Carpathians, in Poland, Galicia, Volhynia, and Podolia, and accompanied the Avars, a far more warlike people, in their migrations. The Slavs entered the peninsula both by invasion and by slow infiltration. Some were certainly pastoral peoples, but to what extent they also practised agriculture is unknown. They were, it would seem, loosely organised in tribes, and showed, at least for a long period, when left to themselves, little power of constituting a stable state.

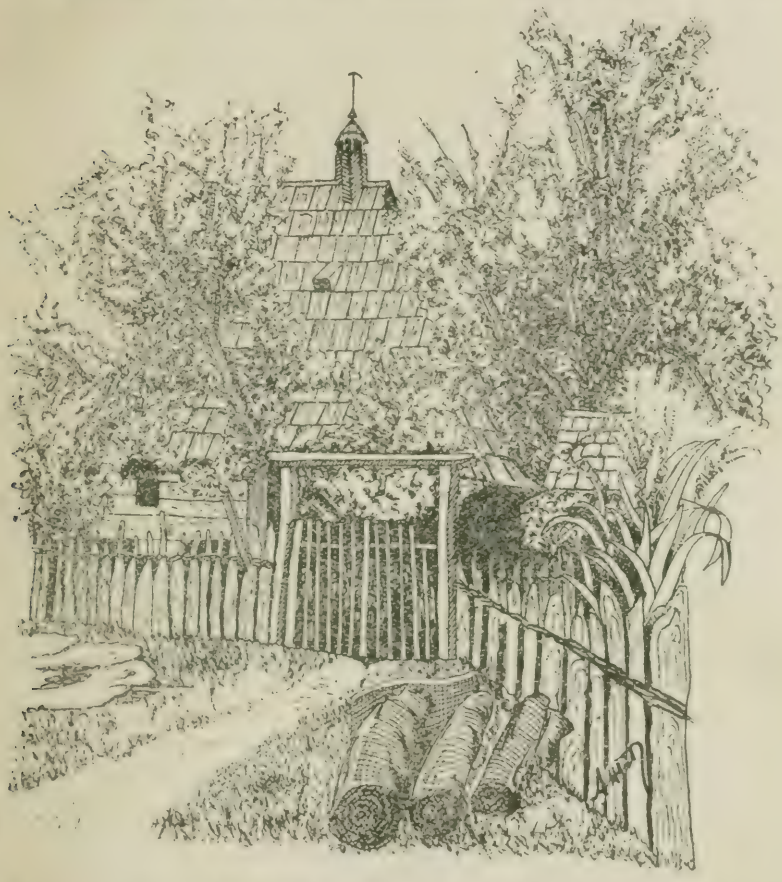
On the other hand, doubtless on account of their capacity for forming small self-supporting groups, probably not dissimilar in type from those which formed later under Turkish domination, they spread widely throughout the peninsula, especially in its central section, and certainly mingled their blood extensively with that of the previously existing peoples. To their slow spread and their close attachment to the soil, no less than to their patriarchal mode of organisation, we may ascribe their power of survival, which has enabled them to become the predominant race, not only within the peninsula, but to the north and north-west of it. As we shall see later, they are generally closely associated with forested land, permitting of a combination of pastoral and agricultural industries. Save under western influences, they do not engage extensively in trade, offering here a marked contrast to the Greeks: nor do they, as a rule, exploit the mineral resources of their lands.

The Ugro-Finns, often described as Bulgars, though the existing Bulgars are of mixed origin, were apparently of very different type. Of Asiatic origin, they entered Europe by the steppe lands of South Russia, and found their way in the latter part of the seventh century, as already stated, to the lands of similar character round the Lower Danube. They were originally nomadic pastoral peoples, far more warlike than the Slavs which preceded them, and early succeeded in establishing, by combination with the Slavs, an important state, which carried on perpetual conflict with the Eastern Empire.

Other incursions of Asiatic peoples followed, but the important point seems to be that, despite successive bands of incomers, which entered round the coast of the Euxine, and despite the military power of the original "Bulgars," not only did extensive intermixture with the Slavs take place, but in learning agriculture in their new home, the Asiatic immigrants tended to approximate more and more in character to the Slavs. The latter within the peninsula constitute the modern Serbs; the former are the modern Bulgars, both being regarded as branches of the South Slavs.

The next great event was the coming of the Turks in the fourteenth

century. Called, in the first instance, by the Byzantines as allies against the Slavs, they entered from Asia Minor across the Dardanelles. In contrast to the Romans, they penetrated through the peninsula by the longitudinal ways, and their persistence has depended upon their



TYPICAL SERB DWELLING AS FOUND IN THE SHUMADYA

Note the use of wood as building and fencing material; the roof is made of shingles, and both the chimney and its cylindrical cap are of wood. The house with its outbuildings is placed within an orchard, and the lush summer vegetation should be contrasted with the small-leaved, evergreen bushes and the desert types of plants shown in the view of the Dalmatian coast on p. 11. (*From Cvijić, "La Péninsule Balkanique."*)

power to hold these. From the southern half of the great Morava-Vardar highway, be it noted, they were not expelled till the Balkan war of 1912. Their retreat from the Morava-Maritza highway has been slow; at the beginning of the present war their hold upon it, and thus upon Europe, was limited to the south-eastern extremity with the focal point of Constantinople.

The next fact of importance, and it is one which can hardly be overestimated, is that within the peninsula, they have never been anything but exploiters, and that necessarily, therefore, their coming told most heavily upon the Slavs. For, it may be repeated, within the interior of the "continental block" of the peninsula, the Slavs, and the Slavs alone, through the period of which we have certain knowledge, have been able to form self-supporting communities dependent upon the cultivation of the land. Greeks, Albanians, and Vlachs, whether owing to the physical characters of the lands which they occupy, or from other causes, have been unable, in any numbers, to obtain a sufficient livelihood from the land and the land alone.

It follows necessarily that a parasitic people, such as the Turks within the peninsula have been, tends inevitably to oppress the Slavs, for they alone, as it were, can produce enough to support overlords. The penetration of the Slavs, in the first instance, at the expense of the original inhabitants, was, as we have suggested, apparently due to their capacity for adapting themselves to the local conditions, the difficulties of internal communication being of little significance to localised self-supporting communities with a loose patriarchal organisation

From this it again follows that the arrival of the Turks—and the statement is true of the arrival of any military power within the peninsula—favoured the earlier inhabitants as against the Slavs. The latter, broadly speaking, for exceptions occur, had two possibilities only before them. They could remain on their lands, and were then enslaved, becoming cultivating serfs or *raya* = cattle, or they could migrate either to the areas marginal to the longitudinal highways within the peninsula, or to the lands beyond it to the north. The migrating groups, wherever the conditions were favourable, settled on the land in their new homes. The question as to which alternative was in practice possible was largely a factor of geographical conditions.

The Bulgars, placed nearer Constantinople than the Serbs, in a district where communication was easier than in the western part of the peninsula, were mostly enslaved, and, as a people, practically disappeared for centuries, though a certain amount of emigration took place into Russian lands round the Black Sea, and it was from Russia that there came the impulse which led to the founding of modern Bulgaria. The inhabitants of Macedonia also were mostly enslaved. But to the north-west of the peninsula extensive emigration took place across the northern frontier, and, further, the relief and the existence of wide forests, especially in the Shumadya, the platform which, to the west of the Morava, slopes down to the Save-Danube, permitted the establishment of groups of free peasants. It was from the inhabitants of such "refuges" that there came the impulse which led to the establishment of modern Serbia, while it was from the constant migration of Balkan Slavs into Croatia, Slavonia, and so forth, that there arose the impulse which is leading at present to the founding of the great state of Yugoslavia.

But during the period when the Slavs of the peninsula tended either to recoil before the Turks, or to be crushed beneath their yoke,

the remnants of the earlier peoples of the peninsula, by this time often with a strong admixture of Slav blood, advanced, as it were, through the ranks of the conquering Turks. With this was associated an increase in the pastoral industry, while the area under the plough diminished. The Vlachs (Vlahs, Aromunes, Rumanians), regarded by Professor Cvijić as descendants of the original pre-Roman peoples, distinguished from the Albanians by the extent to which they were Latinised during the Roman occupation, are wandering shepherds, practising those curious seasonal wanderings to which the French give the name of transhumance. They are now a disappearing race, but their persistence till the present day must be regarded as, in large part, an effect of the Turkish occupation. Wanderings on the scale which is found among them are only possible in lands where agriculture is little practised.

The Albanians, according to Professor Cvijić descendants of the Illyrians, less influenced by the Romans during their occupation than the Vlachs, but with a considerable Slav element, certainly extended their territory markedly during the Turkish domination. Pushed in the early Middle Ages by the Slavs towards the coastal belt, the recoil of the latter towards the north and north-west, as the Turks advanced, permitted them to extend their range far towards the centre of the peninsula.

The Albanians are pastoralists, engaging to some extent in agriculture, but, with the loosest possible social and political organisation, have quite naturally added brigandage to their other occupations. Under the Turks also they took a considerable part in administration, furnished useful material for the army, and show further, in the more settled regions, a tendency to engage in arts and crafts. Hitherto they have been, as a whole, unable to find within the peninsula an adequate livelihood without, in some form or another, plundering other people, especially the Slavs. Their best hope for the future lies in the direction of industry and commerce.

It is to be expected that, as a largely predatory people, they should tend always to come into prominence in the peninsula in periods of great general disturbance. The founding of the independent Albanian state in 1913 was a direct result of the Balkan wars. Austria's support of the scheme, there can be no shadow of a doubt, was due to her desire to hamper the development of Serbia; the Albanian "nationalists" were being used as catspaws in the game of international politics. At the moment an energetic propagandist campaign on their behalf is again being carried on, mostly, it is true, in regions far enough from Albania. It is well to bear in mind, at least the possibility that this propaganda may be in part supported from quarters where the desire to add to the difficulties of the future Yugoslavia is a stronger motive than any love for the Albanians as such. Some of the claims which have been put forward on their behalf can only be described as fantastic, in the absence of any proof that they are capable of founding a stable modern state, or have even any general desire to do this.

Turning finally to the Greeks, we have to note that although the

Turkish conquest meant the collapse of the Byzantine State, and thus the disappearance of a Greek "nation," yet individual Greeks found opportunity, during the period of Turkish domination, to extend their distribution within the peninsula far beyond the zone of Mediterranean climate and products, which is their natural habitat. Further, whatever moral judgments the geographer may pass on the policy of King Constantine and his party in the early part of the present war, in so far as he is philosopher, he must reflect that it has always been a Greek ambition to replace the Turk as the ruling power in the peninsula, and that with the destruction of the peasant state of Serbia one obstacle in the way of that ambition would have been removed.

In order to bring this brief historical sketch up to date, we may add that the last invasion of the peninsula, that by the Central Powers during the present war, took place across the open northern frontier, and had for its object the grasping of the great longitudinal ways. Of these the western, the Morava-Vardar line, was presumably to fall to Austria-Hungary, which would, in the long run, have meant ruin to Greek Chauvinistic aspirations, while the other, the eastern, or Morava-Maritza line, was to have fallen under German domination. Success would have meant a modern scientific exploitation of the Slavs of the peninsula, as against the cruder methods employed by Turkey.

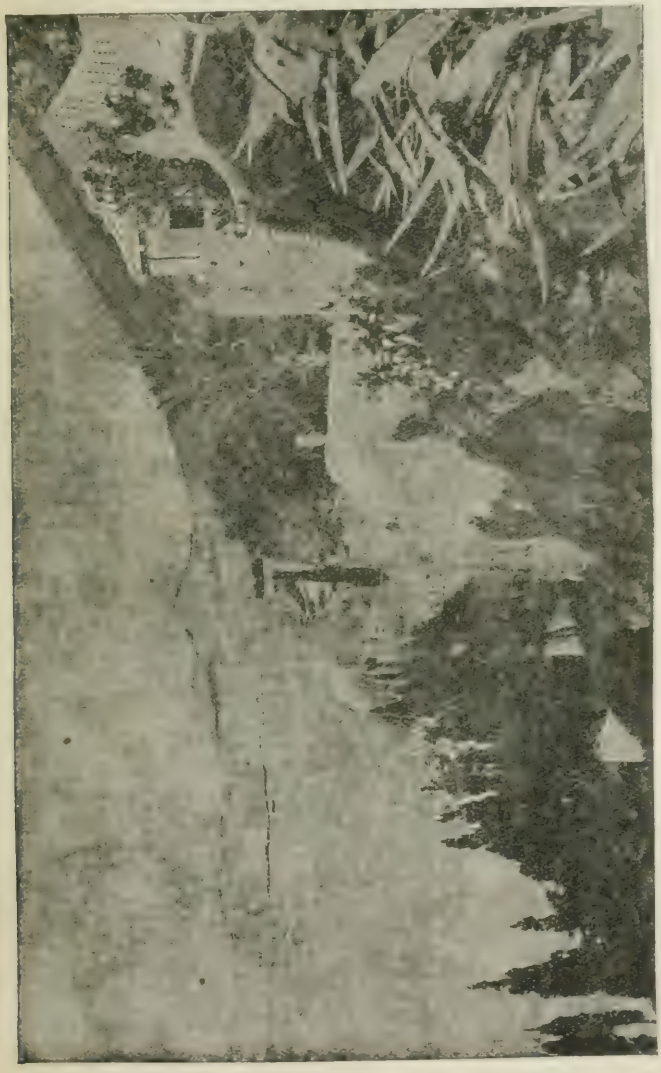
As to the conclusions to be drawn from this historical sketch, we must here purposely confine ourselves to general statements.

The past seems to show that the interior of the peninsula can only be developed by an agricultural people, and both here, and to the north-west, in Slavonia and Croatia, the Slavs have been long established, and show close adaptations to the conditions. But, here as well as elsewhere, the Slavs, left to themselves, have shown little power of establishing stable political organisations. The problems of Yugoslavia will, in any case, be complicated, and while its limits should be so drawn as to give reasonable security, reasonable access to the sea and to neighbouring regions, it is undesirable that they should be made to include wide areas where the typically Slav mode of life is not possible, and where there is a considerable alien element; the inclusion of such areas would require a capacity for statesmanship which the Yugoslavs have not yet been shown to possess.

We may add, as emphasising these conclusions, a brief account of the chief modes of life practised within the peninsula, in their relation to the various races inhabiting it.

The fundamental occupations within the peninsula are three in number—(1) the pastoral industry, (2) agriculture, and (3) garden culture of the Mediterranean type, all three closely associated with special climatic zones. For, as will have become apparent from what has been already said, the "continental block," except for its coast, falls for the most part into the Central European zone, characterised by summer rain and somewhat severe winters; a type of climate favourable to deciduous forests, in which the oak and beech are conspicuous, and to mixed agriculture. The "peninsular" appendage which forms modern Greece, the islands of the Ægean, and, in part, the south coast of the "continental

block," as well as a narrow belt on the west coast, display the Mediterranean climate, with summer drought and mild winters, and spring and autumn rains. In general this climate has a very limited inward extension, for, especially on the west, limestone hills rise in many cases



A view of Ragusa from the coast road, showing the characteristically Mediterranean type of vegetation
(*From "Dalmatia," by Maud M. Holbach.*)

close to the seaboard; but in some places the existence of open river valleys enables it to penetrate towards the interior. This is especially the case in the Vardar valley. The eastern part of the "continental block," and parts of its south-eastern extremity, show the Eastern European type of climate, with deficient summer rain. Here forest

growth is checked by the combination of heat and drought in summer, and trees are either absent or represented only by small, often stunted, groups, in specially favoured spots. This climate favours stock-rearing and a specialised type of agriculture.

Finally, within the zone of Central European climate the elevation of some of the mountains gives rise to limited areas of Alpine climate, with summer pasturages due to the growth of Alpine plants, but no trees. The arrangement of the mountains, also, may give rise to non-wooded areas of steppe-like climate, even within the zone of deciduous forests.

Forests are also absent on the limestone hills which occupy so much space, especially in the west, and, within the zone of Mediterranean climate, they tend, as round the Mediterranean generally, to be represented only by scrub forests (*maquis*), in which evergreen shrubs predominate.

The accompanying illustration [1] of the Dalmatian coast near Ragusa, illustrates the important points in regard to the zone of Mediterranean climate with great clearness.

The presence of agaves and of prickly pears (*Opuntia*), both introduced plants of American origin which have run wild, and of cypresses; the rocky limestone slopes rising near the sea margin; the use of stone instead of wood as building and fencing material, are all very characteristic. The contrast with the forested interior, illustrated in the sketch on p. 7, could scarcely be more striking.

As to the relation between the three fundamental occupations and the peoples of the peninsula, one is tempted to generalise and say that the Greeks practise Mediterranean garden culture, using the pick, itself but a development of the digging-stick of primitive peoples; the Vlachs and Albanians keep flocks and herds and add accessory occupations, the long-handled shepherds' crook being their symbol; the Slavs are cultivators of cereals using the ox-drawn plough; while the Turks exploit the others, especially the cultivators. But the statement, though it attracts by its simplicity, is only partially true if one uses these names in the sense of races. For, it must be repeated, the races are so intermingled that the existence of anthropologically pure groups anywhere seems a pure assumption. Further, the constant migrations within the peninsula, themselves due to historical and economic causes, have brought representatives of all groups into areas where the occupations practised by the majority of their fellows are climatically and economically impossible. One can, therefore, only speak of tendencies, and the attempt to distinguish between "racial" and traditional aptitudes is fraught with many difficulties.

But the lines of social evolution followed by the various peoples classified by occupations is a subject of much interest. Here we may conveniently begin with the pastoral peoples as the simplest.

The typical pastoralists, as already stated, are the Vlachs, who, in

[1] The blocks of this illustration, and of that showing the Gate of Trau, on p. 5, have been kindly lent by Mr. John Lane, the publisher of Mrs. Holbach's *Dalmatia*.

diminishing numbers still carry on wide migrations, from the mountain pasturages of summer to the plains and steppes in the winter. The Albanians also rear animals, though the habit of migration is less marked. Towards the mountainous west, also, many groups of Serbs are, or have recently been, purely pastoral. To the east and south-east Turks, or Turkicised and Tatar peoples, carry on the same occupations, but the less varied relief of the land here tends to cause these peoples to retreat before the agricultural Rumanians (Dobruja region) and Bulgars.

Everywhere, however, the livelihood so gained is scanty and uncertain. There do not, within the peninsula, occur anywhere those apparently illimitable plains which are the habitat of the pastoral peoples of Central Asia. The spread of agriculture has steadily displaced the Vlachs, and if, as suggested, insecurity within the peninsula, by diminishing agriculture, favours the shepherds, yet, on the other hand, that same insecurity presses hard upon them, for it means an increase in the number of brigands and outlaws, who find the flocks an easy prey.

The lines of social evolution followed by the pastoral peoples in those areas where relief, or climate, or soil, or all together, make agriculture difficult or impossible, are interesting. An obvious subsidiary occupation in this country, where roads have always been few, and where the paths are fit only for pack animals, is for the shepherds to become carriers. But, where insecurity reigns, this occupation is unremunerative; for a pack train is more easily robbed, and is better worth robbing by outlaws, than a flock of sheep or a herd of cattle. Where it can be carried on, it tends to be supplemented by minor arts and crafts practised by the shepherd-carriers. The latter have abundant leisure; their wanderings give them access to certain types of raw material, and others are furnished by their flocks; in so far as they are carriers, also, depending on pack animals, they must carry manufactured goods rather than bulky raw material.

Again, the acquisition of skill in minor arts and crafts brings the shepherds into contact with town and village life, and a proportion tend to settle down there as artisans of various kinds. This happens alike with Vlachs and Albanians, but seems less frequent with Slavs. In the absence of this sequence, migration of the males in search of temporary employment is frequent. Originally the migrations were limited to the peninsula and neighbouring lands, but now temporary emigration to America is frequent. In Macedonia especially these movements introduce a disturbing factor into politics, for the migrations, with short intervals of residence in the native village, may extend over all the years from late childhood to the approach of old age; and the absentees tend to return with the "nationality" of the land with which they are most familiar, especially, of course, in the case of migrations within the peninsula, and this whatever their original "race" or their traditions.

Of the Mediterranean garden culture we need not say much—details have often been given and are personally familiar to many people.

An important point, however, is that whatever may have been the case in classical times, under modern conditions the characteristic utilisation of the soil for fruit-trees does not in itself yield a sufficient

livelihood. The raising of domestic animals, except for the goat—a great agent in the destruction of the scanty forest—is difficult. On the other hand, the fact that access to sheltered seas is generally easy makes it a relatively simple matter to carry on trade. The Greek tends, therefore, to supplement the produce of his vineyards and olive gardens by participating in all branches of commerce, from petty trading to the operations of finance.

Perhaps in part as a result of this he is typically a town-dweller, while the Slavs tend to live in isolated farms, or in villages made up of collections of widely-separated dwellings. But here again it is natural conditions, not the "race," which determine the habits.

The illustration on p. 5—of the *Slav* town of Trau—is characteristically Mediterranean. The wall, the gate, the architecture date back to the period of Venetian domination, but the persistence of the emblem of Venice is but a symbol of the fact that here the Slav has become "Mediterranean." It is obvious that dwellers in such a town can have relatively little in common with typical Serbian peasants, dwelling in houses of the type illustrated on p. 7.

Agriculture where typically developed, as in the Shumadya, is productive, but only at the cost of severe labour, for the land has generally to be cleared before it can be tilled. As in Central Europe generally, the tendency was for the first clearings to be made on slopes, thus avoiding the marshes and dense thickets of the valley floors. As in Central Europe, also, the pig, originally compelled to find its food wholly in the forest (note the abundance of acorns and beech-mast) is an important accessory. Further, those fruit trees which are adapted to the climate—in Serbia especially the plum tree—supply valuable food products. The ploughed lands yield cereals, in Serbia especially maize, and the rearing of cattle, horses, sheep, and even goats, is possible, if not on a very large scale. The ox, as already stated, is the ploughing animal. Finally, many kinds of vegetables can be grown. The diet is thus rich and varied, the pig contributing most of the meat eaten, its flesh being preserved by smoking for winter use. The forest furnishes both fuel and building material, and the need to store various kinds of food for the winter season, and to house the animals then, involves the construction of a number of out-buildings round the main building. Professor Cvijic' gives sketches and diagrams showing the bewildering multiplicity of these. Their presence naturally means that the houses must stand well apart from each other.

This fundamental type of agriculture naturally undergoes modification in different parts of the peninsula, and even in the Shumadya the increase in the population since the late middle ages has meant the clearing of more and more of the forest, involving modifications in the original methods. Thus the pig is now chiefly stall-fed on maize, and enters into commerce in place of being reared only for home use. The plums also in various forms are largely exported. Similarly, houses built of stone or brick are replacing the original wooden dwellings. Nevertheless, the typical Serbs remain a people of cultivating peasants, still with well-marked traces of the old patriarchal organisation. The

problem of the probable future destiny of such a people in modern industrialised Europe is bound up with the wider, and infinitely complex problem of the future relations between industry and agriculture in a world which has been brought by "frenzied industry" perilously near total collapse.

SOUTHERN FORFARSHIRE: A REGIONAL STUDY.

By Blanche Hosgood.

(With Map and Diagrams.)

I.—Position and Extent.

Forfarshire or Angus lies towards the middle of the east coast of Scotland, between the Central Highlands and the North Sea, including within its county boundaries part of the Southern Grampians, the valley of Strathmore, and the Sidlaw Hills.

From many points of view it holds an intermediate position. Intermediate between the Highlands and the Lowlands, it shows some of the characteristic topography of each. Bordered on the north by rugged mountains, with but a scattered population, it descends on the south to the shores of the Tay estuary where large industrial centres lie, while its people, predominately Anglian, yet betray the influence of their Highland neighbours.

Thus it is a county of contrasts—topographical, economic, and ethnological.

This paper deals with the southern part of the county only. "Southern Forfarshire" is here used to include part of the valley of Strathmore, the eastern and central Sidlaws, and the coastal lands stretching between these hills and the sea. As thus defined it lies between 56° 27′ and 56° 39′ north latitude, and 2° 34′ and 3° 10′ west longitude, extending over an area of approximately 224 square miles. Within this area the district varies from sandy coast, through rich agricultural lands, to barren moorland, and from sea-level to 1493 feet above it. Where such variety is shown it is difficult to give any adequate general characterisation, and the salient features of the region will be brought out best as a comparison between the different parts as developed.

The western boundary reaches the coast at a point midway between Perth at the head, and Buddon Ness at the seaward end, of the Tay estuary. From this point it trends north-westward, following the line of the old highway from the coast. This route crosses the central Sidlaws by means of the transverse valley of Newtyle, forming the most important line of communication between the Tay and Strathmore. North-west of the pass the boundary line turns east across the strath,

FORFAR
Dundee
Arbroath
Carnoustie
Brechin
Montrose
Forfar
Kirriemuir
Alyth
Meigle
Glamis
Newtyle
Coupar Angus
Lochee
Broughty Ferry
Tayport
Newport
Inchture
Longforgan
Monifieth
Barry
Carlingheugh Bay
Lunan Bay
Red Head
Whiting Ness
Buddon Ness
Tents Moor Pt
Elliot Junc.
Barry Links
Carmyllie
Guthrie
Letham
Craichie
Dunnichen
Auchmithie
Inverkeilor
Lunanhead
Turin Hill
Montrathmont Moor
Rossie Muir
Ferryden
Craigton
Douglaston
Glamis Sta.
Charleston
Meigle Sta.
Alyth Sta.
Newtyle Sta.
Kirkton of Auchterhouse
Kirkton of Strathmartine
Muirhead
Birkhill
Fowlis
Liff
Downfield
Baldovan
Camperdown
Lochee
Invergowrie
Longforgan
Kingoodie
Inchture
Kinnaird
Fingask Cas.
Abernyte
Rossie Priory
Benvie
Knapp
Pitmiddle
Ballindean
Huntly
Balfruddery
Littleton
King's Seat
Lochton
Blacklaw
Hill
Pitcur Glen
Thrieplay
Burnhead
Lundie
Drenley
Lundie Cas.
Auchterhouse
Sidlaw Sanatorium
Auchterhouse H.
Craigowl Hill
Gallow Hill
Gallawfauld
Ardler
Auchterhouse
Arthurstone
Kinpurney H.
Ack Hill
Millton
Glen Ogilvie
Denoon Glen
Kinloch
Belmont Cas.
Jordanstone
Castleton
Balkaithly
Balendoch
Dean
Lassie and Nevay
Kirkton of Kingoldrum
Foldend
Purgavie
Loch of Lintrathen
Bridgend of Lintrathen
Baldovie
Reekie Linn
Craig
Airlie Cas.
Kirkton of Airlie
Lindertis
Westmuir
Southmuir
Logie
Craigton
Hill of Alyth
Shanzie
Loyal
Ruthven
Glamis Cas.
Kinnordy
Northmuir
Ascreavie
Inshewan
Melgan
Loch of Forfar
Dean W.
Kingsmuir
Dunnichen
Vinny B.
Ochterlony
Balgavies
Arbirlot
Elliot
Easter Boysack
Knox
Panmure
Pitlivie
Muirdrum
Salmond's Muir
East Haven
Panmure Mun.
Pitairlie B.
Upper Victoria
Fairmuir
Newbigging
Laws
Kingennie
Baldovie
Buddon
Barry Links
Lochair
Greystone
Carmyllie Sta.
Denhead Sta.
Cuthlie
Guynd
Elliot W.
Combie Mill
Greenburn
Monikie
Hatton
Carrot
Carrot Hill
Todhills
Balgray
Myreton
Mattocks
Craigton
Whigstreet
Kirkuddo
Fothringham
Lour
Kincaldrum
Inverarity
Inverarity Ch.
Douglaston
Kingsmuir
Glamis
Castleton
Balkaithly
Balendoch
Dean
Lassie Sta.
Hotel
Ch.
Glamis Sta.
Ruthven
Ho.
Water
Craigton
Lindertis
Kirkton of Airlie
Airlie Cas.
Craig
Reekie Linn
Foldend
Purgavie
Loch of Lintrathen
Bridgend of Lintrathen
Baldovie
Kinnordy
Northmuir
Ascreavie
Inshewan
Melgan
Kirkton of Kingoldrum
Lustonhaugh
Pattick
Crosston
Aberlemno
Parkford
Corse Gray
Turin Hill
Lunanhead
Clocksbriggs
Pastonacraig
Loch of Forfar
Forfar
Dunnichen
Craichie
Balgavies
Auldbar Rd. Sta.
Auldbar Cas.
Guthrie
Inn
Castle
Glasterlaw
Kinnettles Ch.
Bolshan
Waddy
Low
Rossie Muir
Reformatory
Carcary
Farnell
Maryton Ch.
Ferryden
Rossie Cas.
Dunninald Cas.
Lunan Bay
Red Head
Inverkeilor
Lang Craig
St Murdochs Cha.
Ethie
Kinblethmont
Cauldcots Sta.
Newtoa
Rumness
Auchmithie
Mathwell
Seaton
Carlingheugh Bay
Whiting Ness
Arbroath
Elliot Junc.
Easter Boysack
Knox
Panmure
Pitlivie
Muirdrum
Salmond's Muir
East Haven
Carnoustie
Barry
Monifieth
Buddon
Barry Links
Buddon Ness
Broughty Ferry
Dundee
Tayport
Newport
Tents Moor Pt
Woodhaven
Easter Scotscraig
Tay Bridges
Ferry
Lochee
Dighty W.
Baldovie
Downfield
Liff
Fowlis
Muirhead
Birkhill
Blacklaw
Hill
Littleton
King's Seat
Lochton
Balfruddery
Knapp
Benvie
Abernyte
Rossie Priory
Pitmiddle
Ballindean
Huntly
Longforgan
Kingoodie
Inchture
Kinnaird
Fingask Cas.
Inchmartine
Invergowrie
Dundee
Lochee
Dighty W.
Baldovan
Camperdown
Duntrune
Pourie Cas.
Baldovan Ho.
Kirkton of Strathmartine
Kirkton of Auchterhouse
Kirkton of Teasing
Myreton
Mattocks
Newbigging
Laws
Kingennie
Murroes
Duntrune
Pitairlie B.
Upper Victoria
Fairmuir
Panmure Mun.
Craigton

following the valley of the Dean Water to the exit of the river from Loch Forfar. Thence it is continued along the Caledonian line east and south-east to the Brothock valley and Arbroath. From here to Buddon promontory the district is bounded by the North Sea, and then westward by the estuary of the Tay.

It should be noticed at once that, except on the east and south, boundary lines are not sharply defined, the country just without the area repeating the general features of that just within. Consequently the region is to be viewed in close connection with the surrounding country.

II.—General Structure and Topography.

Across the district from the western boundary to the eastern, and striking approximately west-south-west to east-north-east, is the ridge of the Sidlaws. The mountains present a long, gentle slope to the valley of Strathmore in the north-west, but descend by a series of broken terraces with steep escarpments on the south-east to the coastal belt and Tay estuary. At the western end the highlands are continuous over an area of thirty square miles, and here are the chief heights of the range, culminating in Craigowl (1493 feet), Auchterhouse (1399 feet). From the coast the mountains present a chain of long, round-backed hills; in detail, there is a variety of peaks, some craggy, others terraced, or, like the north-west peak of Kinpurney, regular, conical hills.

Further east, and especially east of the Carrot and Dodd hills, the range declines in height and becomes more broken, forming parallel ridges of hills and low ground. Three main ridges can be traced: the northern and most prominent extends north-eastward through Fotheringham, Lownie, and Dunnichen; the central runs due east, widening out into the mossy heights of the Carmyllie platform (500-600 feet) and reaching Arbroath; while the third is composed of a series of isolated hills, rounded in form and wooded to the summits, which mark the left bank of the Dichty, and descend to the coast at Monifieth.

To the south of these ridges lies the coastal belt, widest in the west, and becoming rapidly narrower towards the east, save where the extension formed by the sandy links of Buddon promontory occurs. This maritime region is one of gently undulating land, with many wooded knolls, and is drained by numerous small streams to the south and east. The coastline shows a great variety of feature, from the low, shelving rocks between Arbroath and Carnoustie, broken only by small stretches of shingly beach, to the wide stretches of sandy downs and links from Carnoustie to Broughty Ferry, or to the river flats of Dundee. At various points raised beaches mark changes in the elevation of the land.

To the north-west of the dividing line of the Sidlaws lies Strathmore, crossed in this part by the meandering Dean Water, which drains from the Loch of Forfar to the river Isla, and so to the Tay. The strath forms a belt of rich alluvial land into which lateral valleys from

the Sidlaws open—the Vale of Kerbet, and the Glens Ogilvie and Denoon.

The Sidlaws owe their elevation to the fact that they are volcanic in formation, the lava which enters into their composition resisting denudation, and forming the broken terraces of the southern escarpment, and the isolated, craggy peaks, often with precipitous fronts, like the south-east face of Denoon Law. Where the basalt of the western peaks is exposed, as on the north slope of Dundee Law, or on the Tealing Heights, it is dark in colour, grey or greenish, splitting along well-marked joints into large blocks, and slaggy in appearance, while layers of ashy conglomerates often occur.

The lava-flows are interbedded with the middle series of Lower Old Red Sandstone, of which the district is composed, resting on an under series of grey sandstones, flagstones, and shale, and being in turn overlaid by a third bed. This latter, deposited in shallow water with a greater proportion of salts of iron, is brown or red in colour.

The ridging of the great Ochil-Sidlaw anticline from north-east to south-west has brought the bedded trap-rocks to the surface, and their distribution controls the features of the present range. In the east where the lava-flows thin out, and are separated by lines of sandstone, the Sidlaws form ridges with intervening low ground; in the west excessive subsequent denudation has exposed the roots of the old vents —at Dundee Law, Balgay, Tealing Height, and Dronley. The quarries at the north of Dundee Hill show the old plug clearly, the central pipe being filled with dark grey tuff, with slight traces of stratification, and the surrounding strata dipping in towards the centre at the summit.

Sheets of intrusive dolerite break through the Old Red Sandstone at Auchterhouse, Balluderon, Duntrune, Kingennie, and Ballumbie, giving the irregular terraced appearance of some of the hills, as, for example, at Balluderon, where a volcanic outcrop forms the whin-covered ridge near the foot of the hill, and where detached basaltic knolls occur.

The enormous denudation which the district subsequently suffered, sufficient to erode the Firth of Tay before the deposition of the Upper Old Red Sandstone, and to remove all traces of this and the carboniferous beds from the district, has stripped the volcanic series from the crest of the anticline. This crest lay through Friockheim, Idvieshill, and Fotheringham, and the oldest beds of coarse grey sandstone and bluish flagstone appear here, the close-grained sandstone forming the valuable pavement beds of Carmyllie. From this crest the rocks dip away northwards at an angle of approximately 10°, the dip being clearly shown in the railway cutting at Newtyle, and southwards at an angle of 15°-20°. Lower down on both slopes of the anticline the bedded trap rocks remain exposed, on the north through Kinpurney, Charleston, and Dunnichen, where a mass of dark green andesite is seen jutting out on the side of the hill, and on the south at Broughty Ferry, the Laws, and Arbirlot, where the outcrop of volcanic rock on the bed of the Eliot Water forms a cascade of from 8 to 10 feet in the river.

Bending down into the synclinal trough of Strathmore on the north, the volcanic rocks are there concealed under an accumulation of glacial

and alluvial deposits, through which the Dean Water cuts its way. Southwards from the Sidlaws they are largely concealed by the newer deposits of the coastal plain.

Thus the district falls into well-marked natural divisions:—

First.—The region of the Sidlaws, corresponding to the anticlinal ridge of volcanic rock from north-east to south-west. Lower in the east, the highlands there are frequently cultivated, supporting a scattered farming population, while the more rugged western hills are at best pastoral, and farms are small and far apart.

Second.—A lowland belt on either side of the hills, forming in the north a part of the syncline of Strathmore. Here the alluvial and glacial

FIG. 1.—Natural Divisions of Southern Forfarshire. I. Sidlaw area; II. The Lowland Belts; III. The Maritime Division. The railways are shown by dotted lines, and the main roads by straight lines.

deposits form good agricultural land. Population is comparatively dense, and the district constitutes a prosperous farming area.

Third.—A maritime region, which must be subdivided. The eastern coast is fringed by a belt of recent deposits, blown sand forming great dunes along the shore. Here and there low rocks jut out into the sea, and small fishing villages occur. Westwards the maritime belt is a great industrial area, dominated by Dundee.

Topographic Cycles.—The topography of the district is the result of at least four distinct cycles of erosion. The crest of the Sidlaws, almost reaching the altitude of the enclosing highlands, represents the approximate level of the whole district when, as part of the ancient peneplain of Scotland, it was uplifted. The general level of the lowlands shows a

second imperfect peneplanation, ended by uplift of the region after the secondary Glacial Epoch, while the subsequent cycle of erosion is represented by the fragments of the 50-feet beach along the coast and the middle river terraces. It was early interrupted by a further uplift, and the more advanced stage reached by the following cycle is indicated by the excessive denudation apparent along the coast at this level, and the general width of the valleys and comparative smoothness of their slopes. A further uplift initiated the present cycle.

Glaciation.—While the masses of igneous rock give the distinctive feature to the scenery in the district, the whole has been profoundly influenced by glaciation. The main lines of relief were apparently left unaltered by the passing of the ice-sheet, but its work in moulding the hills and covering them with a smooth surface of drift is unmistakable. Boulder clay lies over much of the land; it covers the south of the parish of Forfar to a depth of 50 feet, extends far up the slopes of the Sidlaws, and lies piled up on the east of the detached hills of the south. On Dundee Law (573 feet) it may be traced almost to the top of the north-west face, and is heaped up in the depression to the south-east of the hill. Erratics abound. They are found scattered over the north flanks of the Sidlaws, and some blocks of Highland granite of great size occur. One of these may be seen on Carmyllie Hill, 400 feet above the level of Strathmore; it consists of a block of granite 5 feet high and some 8 feet long, and has clearly been carried from the Highlands. Other smaller rocks lie near the summit of Craigowl (1492 feet).

The direction of ice-movement is easily recognised. The ice-shed lay along the north-west margin of the Tay basin, and at one period the district was entirely submerged. The ice-sheet moved south-eastwards across Strathmore, and over-rode the Sidlaws, being deflected by the range further to the east, so that it crossed the southern part of Forfarshire from west to east. On the coast, in the extreme east, it appears to have been further deflected, owing to the influence of the Scandinavian *mer-de-glace*, and given a north-east direction. Striæ on the slopes of Bractullo, and on the north side of Dunnichen Hill, show the original south-eastward passage. This is also clearly marked by moraines in Strathmore, trending north-north-west to east-south-east. They may be seen to the south of Loch Fithie, and just east of the Dundee to Forfar railway there.

Other moraines mark equally well the west-to-east direction of the ice-sheet after the Sidlaws had been passed. Such are the groups of smooth hills, grass covered, 500 feet high, and from a mile to three-quarters of a mile in length, which stretch due west-to-east through the north of Strathmartine and at Baldragon.

In three districts the direction of what are apparently true moraines fails to agree with the general movement of the sheet, but a particular reason for the direction followed may be suggested in each case. The south-west-north-east lie of those in the Vinney valley, west of Letham, appears due to a local deflection of the ice-flow, caused by the obstacle of the Dunnichen Hills, just north of the area. Similarly, the moraines lying parallel with the Dean Water have been deposited by the ice-

current deflected westwards along Strathmore on meeting the Sidlaws. The whole form of this valley bears witness to the passage of a glacier down it.

Morainic deposits, further, stretch from west to east in the neighbourhood of Carmyllie. This area probably represents the meeting-place of two streams of ice, the union of which resulted in the north-east trend of some deposits, although the distribution of the deposits throughout the whole district is irregular.

The boulder clay which forms these hills and covers so much of the level ground is stiff, somewhat sandy, and full of stones of all sizes. It is distinctly red in colour in the Sidlaw district, showing that most of its constituents are local in origin; that of Strathmore is less red, and stiffer. Where the clay is exposed in the escarpment along the railway between Restenneth Priory and Clocksbriggs, near Forfar, some slight stratification is to be seen. It is suggested that this is due to the action of the waves of the shallow sea which filled Strathmore during a temporary period of depression in the later ice age.

In many parts of the valleys the clay is covered with fluvio-glacial deposits, forming steep hillocks or winding ridges of gravel and sand, charged with water-worn stones. These ridges are well developed in the Dean valley, north of Glamis, where they mark the deposits of the summer torrents from the local glaciers in Glen Ogilvie. Three prominent kames lie between Glamis and Dunkenny, dying off towards the Sidlaws in broad flats of sand, like the "frontal aprons" of the North American kames. Similar mounds may be seen at the heads of some of the valleys in the Sidlaws and in the maritime district.

Among the latter perhaps the best examples are found in the Brothock valley, where Keptie Hill and the series of knolls between Cairnie Hill and St. Vigeans run north-south, approximately, across the valley. The gravel exposed on the slopes of the former is full of large, sub-angular pebbles. These kames must date from the time when the ice-sheet had melted from the low ground, but snow still covered the Sidlaws, giving rise to floods during the spring and summer months.

Soils.—Owing to the fact that much of the district is covered with glacial and recent deposits, while elsewhere volcanic rocks are exposed at the surface, great inequalities of soil are found. In some parts it is peculiarly rich, in others poor and thin, though the area of good land far exceeds that where soil conditions are entirely unfavourable.

The best areas are those where volcanic material is mixed with the later clay deposits. Thus, the lower districts of Dunnichen, to the north of the main ridge of the eastern Sidlaws, where the dark clay is covered with decomposed trap, are famous for their fertility. So, too, the land in the neighbourhood of the volcanic outcrops east of Dundee is very rich, especially between Dudhope and the Craigie district, while a strip of good farming land follows the exposed andesite through Monifieth, Barry, Panbride, and Arbirlot.

On the other hand, the sandy and gravelly coastal belt is useless for agriculture, and along the southern base of the eastern Sidlaws the thin, peaty soil, resting on poor clay, wet and cold, makes cultivation un-

profitable. In some districts, further, as Panlathy, the clay is too stiff, or the soil extremely stony, as in the Dundee district.

On the Sidlaws a marked difference is found between the southern and northern slopes. The northern, covered with glacial débris, have, on the whole, but a poor soil, peaty in parts, and full of stones, but on the southern terraces a light, dry mould rests, collecting in the depressions, and making them very fertile.

Where the mountains widen out to the east, forming the Carmyllie platform, a thin layer of cold soil covers the more level surface. Mosses, like the Dilty Moss, and small peat bogs occur, and, owing to the impermeable subsoil, wide stretches are boggy for part of the year. Throughout Inverarity drainage is difficult and the soil is poor. Here, however, as in many parts of Strathmore, extensive drainage operations have been carried out; so that, for example, the marsh, two miles in length, which originally lay round Meigle has disappeared, and the land is now cultivated.

The western heights of the Sidlaws show a thin covering of blackish soil, dry and crumbling. In the lateral valleys much of the soil is good, but it does not lie sufficiently deep on the slopes to admit of ploughing.

Strathmore forms a fertile strip to the north, but here again conditions are unequal, the surface covering varying from sand or clay to good alluvium. The clay deposit is thickest and most continuous at the eastern end of the strath, the western being covered with a light, red alluvium.

III.—Coastline.

Reference has been made already to the variety of coastline in the district, whereby in some parts shelving rocks, and in others drifting sands, fringe the sea. When to this difference is added the fact that part of the coast is exposed to the open North Sea, while part lies in the sheltered Tay estuary, great variations in the rate of erosion or accretion will be expected. Both processes are being rapidly carried on in certain tracts.

Erosion is most manifest in the north-east at Arbroath, where a yellowish or red friable sandstone, much faulted and easily disintegrated, reaches the coast. Here the shore road has had to be shifted twice, owing to the inroads of the sea. The trend of the coast just west of the town allows the storm waves, driven before the north-east gales, to strike obliquely along the shore, wearing it away, and carrying the débris along the coast. As it drifts some is deposited in the little inlets between Arbroath and Carnoustie, forming the small, sandy patches that occur there. The greater part, ground into the finest sand by being incessantly pounded on the shore, is carried along until the force of the waves is counterbalanced by the outward currents of the Tay estuary. Here deposition takes place, and the sands of Buddon Ness have accumulated.

The building up of the coast may also be seen to the east of Moni-

fieth, in the sheltered estuary, where a sandy spit is being formed. The growth of this towards the south-east is noticeable even from year to year, and coarse grass now grows over an area which a few years ago was covered by the waters of the estuary.

On the adjacent piece of coast, however, erosion is also at work. From the records of the alterations of coastline here the ratio between the two forces is about that of 5 : 4, erosion being the stronger. In 1908 a strip of land a mile long was carried away at high-tide, and in 1912 part of the promenade of Monifieth was wrecked by being undercut. In some parts fifty feet have been lost within a few years, and the lighthouses on the promontory have been shifted owing to alterations of the coast. To check the loss a series of sixteen groynes has been erected recently to the east of Broughty Ferry.

Farther up the estuary lie the river flats of Dundee, one hundred and eighty-eight acres of reclaimed land lying between Yeaman Shore and Seagate and the water they once reached. Much of the city is built on this area, behind which the land rises to a steep terrace.

Raised Beaches.—This is one of a series of terraces that may be traced at intervals along the coast. The highest of these "ancient sea margins" consists of a sloping platform about a mile in width, and approximately one hundred feet above the sea, but rising in level from east to west. The shelf may be followed almost continuously from Arbroath through Panbride to Barry, where it stands out conspicuously at the back of the town. After a break of some quarter of a mile it continues westward, ending abruptly to the east of Dundee in a fault.

It is partly a terrace of erosion, partly one of deposition, the deposits of stratified sand and gravel resting on a ledge of denuded boulder clay. This is shown at the village of "Clayholes," north of Carnoustie, where the boulder clay appears.

The fine, even layers of sand seem to point to deposition in a fairly deep sea. In parts the sand and gravel contain water-worn pebbles, several inches in diameter, and some more angular stones. These may have been brought down by torrents from the morainic débris left strewn on the ground as the ice melted, and thus have become mixed with the coastal deposits, or they may have been dropped by icebergs drifting along the shore. That some at any rate travelled in this latter way is certain from the occurrence in the deposits at Barry of pieces of chalk flint which are traced to the Aberdeen coast.

This terrace, broken at intervals by the little valleys of the south-east-flowing streams, descends on the whole abruptly to one at a lower level.

The terrace of the fifty-feet level is much less clearly marked, though it is to be seen running due east-west at East Haven and Carnoustie, and as a very narrow strip at Inverpeffer. Elsewhere subsequent denudation has caused it to merge into the lowest terrace, and the step formation is replaced by a continuous gentle slope. The slight grassy slope behind Eliot Junction seems to be thus explained. The terrace finally disappears one and a half miles west of Broughty Ferry (which is built on the terrace), where a ridge of andesite reaches the coast.

the volcanic rock having successfully resisted the shelf-cutting action of the sea at this level. From the outer edge the terrace rises gradually inland, being covered with a light loam and gravel, which rests on a subsoil of stiff clay. The soil differs from that of the higher terrace in its freedom from large pebbles. On the ploughed land of the level top and on the slopes scarcely a stone is to be seen.

At a height of twenty-five feet from the present sea-level a third terrace appears, more perfect than either at the higher levels. It stretches almost without interruption from Dundee to Arbroath—that is, along the whole coastline of the district. It varies, however, a great deal in width, being in some parts very narrow, and elsewhere widening out into the broad plains of Barry, with an area there of ten square miles.

At intervals the bluff of the fifty-feet terrace appears on its inner margin, undercut, and with every sign of great erosion, so that apparently the sea stood for a longer period at the level than in either of the previous cases.

Much of the terrace is sand-covered, the deep sands of Barry and Carnoustie lying piled up on it.

Sand Dunes.—It is here that the sand dunes, the most conspicuous feature of the coastline, are found. They extend across the peninsula, and occur at intervals along the eastern coast, showing every stage of development. Those across the landward side of the promontory are fixed ; others towards the seaward end are primitive dunes, either still completely unfixed by vegetation, or only slightly fixed, so that they form a series of alternate ridges and hollows ; while at the present sea-level incipient dunes can be seen in the sandy spits projecting into the sea.

The most prominent of these incipient dunes extends south-eastward from a point just east of Monifieth, and at every low tide forms a sandy strip reaching almost as far as the other edge of Lady Bank. This bank itself suggests that at one period it may have formed the sand-dune margin of the Tay, the hollow between it and the present margin having been flooded by the sea.

The dunes formed on the surface of the table-like peninsula lie along both east and west coasts. They are, however, much more prominent on the east, where they are composed of a very fine red sand formed, as I have suggested already, by the weathering of the red sandstone cliffs at Arbroath, and drifted along to this point during the north-east gales. The western dunes are lower, while the sand is coarser in grain, and yellow in colour. In these respects it corresponds exactly to the sand of the Barry Sands along the western margin of the promontory, and seems to have been carried by south-west winds on to the shelf.

The eastern dunes form two groups. In the north-east there are five roughly parallel ridges. The most eastern of these, lying parallel to the coast, shelves gradually from the edge of the twenty-five-foot platform to a flat top over fifty feet high and some hundred feet wide. From this it descends gently on the inner side. The outer slope is without sign of

vegetation, but the inner slope and the succeeding hollow have a sparse covering of sand sedge, increasing in amount up the steep face of the

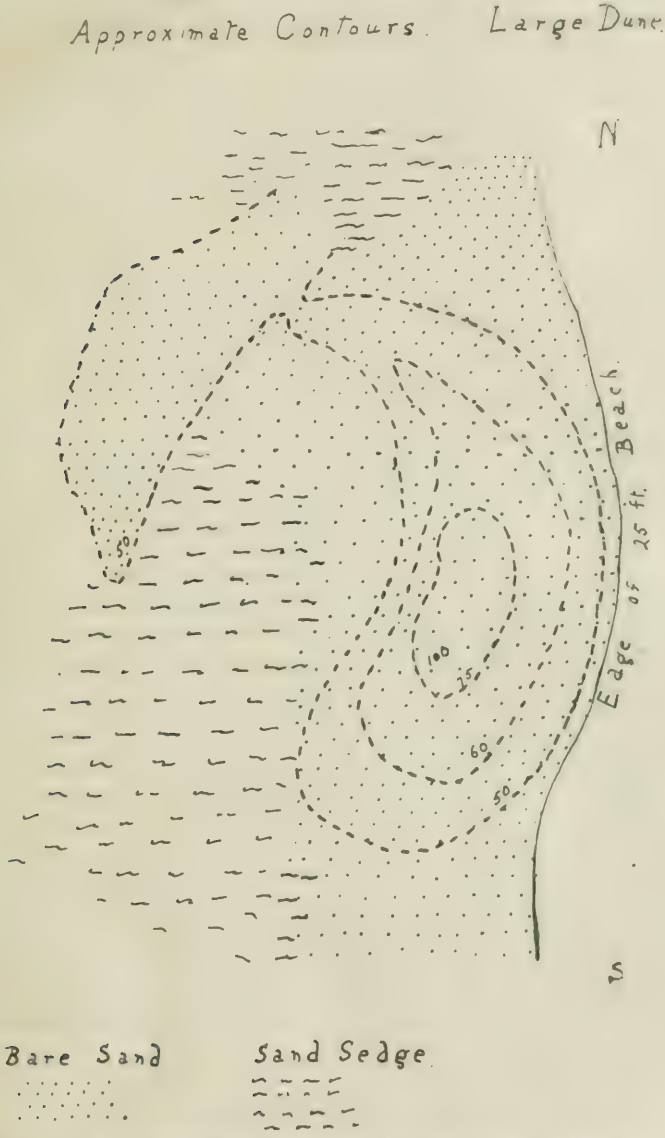


FIG. 2.—Approximate contours of the main dune on Barry Links. Scale about 12 inches to a mile.

second ridge. This runs north-north-east to south-south-west. Across the summit of this ridge the sedge ceases, and all the landward slope,

the wide intervening hollow, and the third ridge are unfixed. This, I think, is due to the fact that the hollow here runs right out to the coast, and from its direction allows a free passage for the north-east wind, the strength of which is indicated by the deep surface ripples across the hollow.

The remaining ridges are more broken, and are formed in the east by a series of small dunes, fifty to sixty in number, of varying height, but averaging ten to twelve feet above the platform. They show perfectly the crescent formation, concave to the north-west, and fringed along the crest with tall sand sedge twelve to fourteen inches high. Westwards the dunes become wider and less definite, but continue almost to the west coast.

This series of parallel ridges is separated by a gap a quarter of a mile wide from the chief dune of the promontory, the gap being interrupted by low scattered dunes partly fixed.

The main dune (Fig. 2) is one hundred feet high. It lies close to the coastline, rising with an angle of about forty-five degrees to the twenty-five-foot level, and then more gradually to the flat top. The inner slope is very abrupt. The whole dune is entirely without vegetation, and its recession from the coast is in active progress. Towards the south it dies away into a line of smaller dunes, which continue out to the top of the promontory, where the hills average forty-five feet in height.

The western dunes are much lower and, on account of their relatively sheltered position, are partially fixed. In many parts the sand ridges entirely enclose a depression which is covered with a continuous growth of sand sedge, extending to various levels up the ridge slope. Many of these hollows retain water for long periods, the pool becoming surrounded with marsh plants that aid the binding process. Dunes of this type occur fringing the coast between the north-east of the promontory and Monifieth, and also west of Arbroath. In March, after three weeks without rain, the majority of these enclosed large pools of rain-water.

Permanent dunes stretch along the landward side of the promontory. Here the ridge and hollow effect is almost lost, but it is indicated here and there. Large areas of these dunes now form golf-links, while other parts are farmed. There is a certain amount of arable land attached to the farms, but they are mainly in grass. This is reflected in the agricultural statistics issued for the parish of Barry, where the extent of grazing land is given as 1713 acres, the parish ranking third in the whole district.

IV.—Drainage.

The watershed of the district lies on a line from south-west to north-east, approximately coincident with the original anticlinal crest. It is clearly marked in the west, where the basaltic heights of Craigowl and Auchterhouse drain by long streams, consequent in their upper reaches, to the north-west, and by short streams to the south-east. In the

centre, however, it is difficult to trace, especially in the neighbourhood of Gallow Hill and Dilty Moss, where the almost horizontal strata are spread with an irregular layer of glacial drift, which covered the pre-existing valleys and formed a region of indeterminate drainage. On the moors of this district artificial regulation of the streams has obscured the natural system.

In the extreme north-west the Vinney flows in an anticlinal valley to the Lunan Water, while to the south-east a series of short consequents drain to the estuary of the Tay and the North Sea.

On the whole, the present drainage represents that existing before the passing of the ice-sheet, the retreat of which left the ground covered with drift, and the valleys partially filled up with gravel deposits.

When, after the secondary glaciation, changes in the relative level of land and sea took place, the streams were rejuvenated, and new cycles of erosion started. Thus was caused the series of terraces which are found along all the main valleys.

From evidence apparent along the coastline at least three such changes took place, and in most valleys two terraces can be seen, though frequently in a very fragmentary, denuded state. An interesting relic of one of the old terraces is seen at St. Vigeans, near Arbroath, where the parish church stands on the cut-off spur of an ancient terrace. The old river-bed can be clearly followed round the spur, the edges of which have been trimmed and smoothed by the current.

In the case of the Dean valley three levels may be identified in different parts; the width of the valley enclosed by the highest terrace, under the denuded margin of which the village of Glamis stands, indicates the relatively mature stage reached during the second cycle of erosion.

Dean Water.—This river-course falls into two very distinct parts, as a comparison of the profiles makes evident. The upper part consists of the consequent Kerbet Water, flowing first due east and then north. The abrupt elbow thus made suggests a possible capture by the headward erosion of the consequent stretch, but no evidence of this could be found on the ground. The right-bank tributary, entering above Inverarity, is apparently an example of reversed drainage, the stream having originally flowed south-eastwards to the Crombie Water, but here again no satisfactory evidence could be obtained. There is no trace of the dry valley, and the present drainage is very indefinite.

The lower part of the river-course forms the Dean Water, crossing the synclinal trough of Strathmore. Its longitudinal profile shows a smooth concave, the fall from the river's exit from Loch Forfar to its junction with the Isla, a distance of ten miles, being only forty feet. The upper course has been artificially straightened, and a connecting drain cut to Loch Forfar, but below Glamis the natural valley exists. The river flows in entrenched meanders, having ploughed its way into the boulder clay of the valley floor for a depth of about six feet. Below Cookston the valley shows a continuous succession of bluffs, and erosion and deposition are in active progress. Undercutting of the banks of the spurs is apparent everywhere. It is so rapid that in spite of a series

of artificial supports, slipping of the clay banks is common, and great mounds of fallen bank lie in the river. At several points, notably about two miles above Cardean, a recent straightening of the course has taken place, and a large ox-bow lake has been formed.

Two tributaries from the Sidlaws break through the left bank, and owing to the increased volume of these during the spring, and to the impermeable soil of the bed, the river frequently floods in this season. No record of the continuance of these floods was obtainable, but they lie long on the land on account of the slightness of the stream gradient. After an unusually dry month, and at a point where the banks were five feet high, sheets of water could be seen lying behind a natural dyke of river alluvium.

The tributaries (Glamis and Denoon Burns) show a very different type of valley. They are consequent streams, following the dip of the volcanic rocks to the north-west, and their beds are still ungraded. The Glamis Burn is engaged in cutting a gorge through an elbow of Hunter's Hill, a basaltic peak.

The drainage of the southern slopes is simple, short consequent streams flowing thence across the coastal plain in parallel valleys. The upper valleys are exceptionally deep, but near the coast the rivers spread out in wide sheets across the sandy fringe. The Buddon and Pitarlie Burns, crossing the head of the Buddon promontory, are constantly changing their lower channels in the loose soil.

Two of these consequent streams enter the west-to-east valley of the Dighty. The general direction of the river is clearly governed by the morainic deposits of the neighbourhood. Reference has already been made to the series of west-to-east drumlins along its northern bank. These control the direction of the upper course. Where they cease the river flows at first in a more open valley, but is contracted again at Linlathen where other morainic deposits occur on the right bank, while the volcanic trap rock crops out on the left. At frequent intervals along the valley an old terrace can be traced.

With the exception of the small tarns of the western Sidlaws, and some variable lakelets among the moors of the east, all the lakes of the district lie in the lowlands, forming two groups—those of the Lunan basin in Strathmore, and those of the Monikie basin south of the Sidlaws. In both basins the lakes are but shallow sheets of water, lying in hollows in the glacial drift, the irregular deposition of which has caused their formation. Their shallowness in comparison with the area drained, and that of the lakes themselves, is brought out by the following table :—

Lake.	Area.	Drainage Area.	Average Depth.
Forfar, . .	105 acres	2½ square miles	11½ feet.
Balgaries, .	52 ,,	⅔ ,,	10 feet.
Monikie (North),	73 ,,	4 ,,	13½ feet.
,, (South),	47 ,,	4 ,,	12½ feet.
Crombie, .	41 ,,	2½ ,,	18 feet.

Consequently they are very readily silted up, either by the alluvium

brought down by some feeding river, or by the "creep" from the clay banks. Many have been completely filled, their previous existence being deduced from the occurrence of small sheets of smooth and stoneless loam, lying in shallow hollows in the till. Such may be found frequently in the east of Strathmore, while the alluvium spread in the depression at Newtyle and in the Kerbet valley appears to fill old lake beds.

Old maps of the district show a number of lakes which do not now exist. Thus Edward's map, dated 1678, marks large lakes near Dunnichen, and at Barry. These have completely disappeared. Others shown have now been partially filled up. A later map (1814) shows Loch Fithie joined to Rescobie, while the present little lakelet of Restenneth is described as then covering 200 acres. Some of these reduced lakes have been artificially drained, with the object of obtaining the shell marl they contain, originally much used as a fertiliser. Among these is Loch Forfar, the largest of the present lakes, the level of which was lowered sixteen feet when the drain to the Dean Water was cut. This reduced the area to half the original.

All along the south-east margin the old shelf of the lake is traced distinctly, rising, on a rough measurement, to a height of twenty feet above the present level. The increase of four feet on the figures quoted above is probably due to seasonal variations in the water-level. (A range of four feet is registered for one of the neighbouring lakes by the Survey of Scottish Lakes.) From the northern shore a peninsula juts out into the lake; this is continued to the south-west by a submerged causeway, above which the water may be as shallow as one foot. This causeway is artificial, and represents part of the "crannog" discovered when the lake was drained.

The reed swamp which extends round the eastern end is characteristic of all the lowland lakes of the district. Some show only a low reed swamp, others have an outer girdle of tall rushes, while all have a growth of weeds in the water. This development of plant life is connected with the size, already mentioned, of the drainage area of the lakes, which results in unusually large supplies of plant food. Thus Balgaries, which, owing to its receipt of the overflow from Loch Rescobie, has the largest drainage area, shows extensive swamps at both ends of the lake.

The southern lakes, Monikie and Crombie Den, have been cleared and deepened for reservoirs in connection with the water supply for Dundee, though the main supply for the city is now drawn from Loch Lintrathen, outside the present district.

(*To be continued.*)

THE EDINBURGH UNIVERSITY DIPLOMA IN GEOGRAPHY.

By Geo. G. Chisholm.

The alternatives offered for the obtaining of this Diploma, the regulations for which are given below, are the result of the wide scope of the subject, and the consequent necessity for some limitations if the subject is to be pursued intensively. But the governing idea in framing the regulations may be looked on as involved in the conception of geography set forth in the opening lecture of the present holder of the lectureship, published in the *Scottish Geographical Magazine* for November 1908, where the study of local conditions and place relations as directly or indirectly affecting human life is taken as the principal aim of the geographer, the lecturer maintaining that "so important are the influences attached to local conditions and place relations that it is of the highest consequence to have a class of investigators whose constant and single aim is to see that the known causes that affect the value for man of place are never overlooked, and to be always searching for unknown causes that have the same effect."

According to this conception, which is becoming more and more illustrated in geographical books and papers, written in a scientific spirit, there is no limit to the range of knowledge that may be pressed into the service of geography. But the human mind is limited, even the most comprehensive. It was said of Whewell, "Science was his forte, omniscience was his foible." This foible is apt to be a trap for geographers, inasmuch as sound geographical appreciation depends very much on the extent of one's knowledge; but, if the right point of view is once attained, such knowledge as is acquired in the course of one's life will be more effectively applied than otherwise it would be. It is important, therefore, for teachers of geography to acquire the habit of being always on the watch for applications of the kind indicated above.

The present diploma recognises some training in science as necessary, but takes for granted the impossibility of training in all the sciences to which geographers may have to appeal. The application of such science through physical geography is given in the ordinary course in geography as a necessary basis for all geographical study. The making of the study either of history or political economy as well as economic geography obligatory is a natural corollary of what has been already indicated as the governing idea in the regulations. The prescribed course in economic geography, it may be explained, is mainly taken up with an analysis of the economic and particularly the commercial development of some of the leading commercial countries of the world during the last forty or fifty years, with special reference to the geographical conditions that have influenced that development. The addition of the subject of economic ethnography as defined will, it is hoped, be universally recognised as of the highest importance in a country like our own, which is responsible for the government of so large a proportion of the backward races of the world, the guidance of

whom must become a matter of ever more concern in virtue of the rapidly increasing demand for raw materials obtained from regions in which such races must furnish the labour. Take, for example, rubber supply. No one surely will question the importance of an exact understanding of the multiform geographical influences affecting the competition of diverse regions in which rubber is still gathered wild and those in which it is produced in plantations, and that involves as accurate a knowledge as can be obtained of the conditions of life and the capacities of the labourers in various grades, mostly coloured labourers.

Regulations for the Edinburgh University Diploma in Geography.

1. Candidates for the Diploma must have graduated in Arts or Science at Edinburgh, or some other recognised University, or must be qualified to graduate at the same time as the Diploma is conferred.

2. The Diploma shall not be awarded earlier than the conclusion of the candidate's fourth year of University study after completing the Preliminary Examination.

3. Candidates must have included in the curriculum for the Degree, in addition to Geography:—(1) Geology, *or* Mathematics with practical work in Map projections, *or* Natural Philosophy; (2) History *or* Political Economy; (3) any one of the foregoing five subjects, not already taken under (1) or (2). If they have not done so, they must attend such courses and pass examinations in these subjects up to the Degree standard.

4. Candidates must also take:—(1) The full Honours course in Economic Geography; (2) one of the following half courses—(*a*) Historical Geography, (*b*) the History of Geography, (*c*) Economic Ethnography II. as defined below; (3) a half course in Surveying in the Engineering Department.

5. Candidates will also be required to take:—*Either* a course in Geodetic Surveying, *or* two of the following half courses not already taken under the preceding regulation—(1) Historical Geography; (2) History of Geography; (3) Economic Ethnography I.; (4) Economic Ethnography II.; (5) Statistics. Economic Ethnography is defined as embracing the study of the influence of geographical environment on the life of the most important peoples, but giving prominence also to questions connected with labour power and purchasing power, in case of non-European races both before and after contact with European races, and questions connected with standards of living as affected by geographical conditions: I. in pre-railway times from the period of the great maritime discoveries; II. in more recent times.

6. The subjects of examination shall be as follows:—(1) Economic Geography, two papers of 3 hours each; (2) *one* of the following—(*a*) Historical Geography, (*b*) History of Geography, (*c*) Economic Ethnography II.: one paper of 3 hours in the subject selected; (3) Elementary Surveying; (4) *either* (*a*) Geodetic Surveying, *or* (*b*) two of the following not already taken under (2)—Historical Geography, History of Geography, Economic Ethnography I., Economic Ethnography II., Statistics: one paper of 3 hours in each of the two subjects offered. Candidates will be permitted to offer more of the optional subjects required for the Diploma, and a pass in such additional subjects will be entered on the successful candidate's Diploma.

GEOGRAPHICAL NOTES.

EUROPE.

Neanderthal Man in Malta.—Professor Arthur Keith, in a letter to *Nature*, records the very important discovery of remains of Neanderthal Man in the Ghar Dalam Cave of Malta. The remains so far discovered consist only of two teeth, but the cave floor appears to be extraordinarily rich both in human and animal remains, and further investigation is much to be desired. The first excavation here was made in 1914 under the auspices of the British Association, which made a small grant towards expenses. Further investigations were made in July and August 1917 by Dr. Despott, and led to the discovery of the teeth. The letter in *Nature* gives illustrations of the teeth, and a section of the cave showing the strata encountered on its floor.

New English Port and Establishment of a Channel Train Ferry.—As appears from articles in the *Times*, reference is now permitted to the fact that during the war period a new port has been laid out at Richborough, near Sandwich, Kent, and that during 1918 a Channel train ferry was established, one of the terminals of which was at Richborough.

Work on the new port was begun in 1916, with the purpose, in the first instance, of forming a base for the cross-Channel barge service, Dover, the first base, having had to be given up for naval and other reasons. The port extends over some 2200 acres, and is most elaborately and efficiently equipped. From it a barge service has been carried on with Calais and Dunkirk since the end of 1916, the barges, in many instances, being despatched without transhipment to the "canal-heads" on the waterways and canals of France and Belgium. The Channel train ferry has been in operation since February 1918, and two English terminals have been constructed. That at Richborough connects with both Calais and Dunkirk, and goods trains during the war were run direct from the sidings of munition works to Richborough, where there is an automatic rising platform, then on board the ferry boats, and so across the Channel, where the trains pass direct to the French railway system. The establishment of the ferry involved the widening of the Stour to 500 feet, and the deepening of the estuary. The sludge dredged from the river bed was used in reclamation of the foreshore marshes, and over 250 acres, formerly flooded at high-water, have been converted into solid level ground five to eight feet above water-level, utilised as a Royal Air Force depôt. Though Richborough can never be a deep-water port, it is believed that it will prove adaptable to the needs of peace traffic, the ferry especially meaning a great saving of man-power in dealing with heavy goods. The development of the Kentish coalfields may greatly increase the value of the port after the war. In addition to Richborough, another train-ferry terminal has been established at Southampton, from which a ferry vessel runs to Dieppe.

AMERICA.

The Finn in America.—Under this title Mr. Eugene Van Cleef published in the September number of the *Geographical Review* an article which is both interesting in itself, and in that it suggests a possible line of investigation in human geography which might lead to results of importance. The immediate subject of the article is a discussion of the distribution of Finns in the United States, and of the part played by them in the development of the country.

The facts as to the first point are easily summarised. Finns in the States are predominantly rural, and are markedly attracted by the district round Lake Superior. In this region dwell some 150,000 Finns, about three-fourths of the total number within the States. In St. Louis County, in north-eastern Minnesota, nearly sixty per cent. of the farmers are Finns. Across the Canadian boundary, it is noted, the same tendency to settle near Lake Superior is obvious. The first Finns who settled here were attracted by the mines, and a certain proportion still work both in the copper and iron mines. Since surface mines, in this region of cold winters, cannot be worked all the year round, lumbering is another occupation of Finns, some of whom alternate between lumbering and mining with the seasons. In both cases, however, the determining motive is not inclination but financial necessity. Whenever he can the Finn takes up land, either as a homesteader or after purchase in the open market. In view of this fact, it seems at first sight remarkable that Finnish settlement should take place in an area which suffers from a combination of disadvantages. The climatic conditions are severe; the land is forested, so that it must be cleared; swampy, and thus requiring drainage; and sprinkled with glacial boulders which must be removed before it can be ploughed—generally, it seems to offer little to the settler. Mr. Van Cleef has, however, little difficulty in showing that, even in detail, it offers close resemblance in climate and characters to Finland, and this is definitely given by many settlers as the main attraction. Further, the slow, tenacious, and economical Finn is both willing and able to develop land of this type, and his habits and traditions appear to give him an advantage over all other possible settlers. The new settler builds first a tar-papered "shack," and clears about an acre of the best land in his first summer. He may spend the winter as a lumberman or in some other occupation which gives him ready money, and continue the process of clearing the following summer. His first crops, and his most important crops always, are potatoes and swedes, his first purchase a cow. As in Finland, pigs are rarely kept, and cereals such as oats, rye, and barley are grown only in small quantities. As the farmer prospers he builds first a log cabin, and later a modern dwelling, and tends always to specialise in dairy farming.

The Finns which enter the States are mostly broad-heads from eastern and northern Finland, and show in their new country most of the characteristics displayed in the old. Thus they are stubborn and suspicious, yet, despite the latter quality, the co-operative movement has

made great strides among them. They show a great appreciation of the value of education, and in the States, as in Finland, the percentage of illiteracy is low. Finally, in both Socialism, especially of the extreme type, is widespread. A curious fact, however, noticed by Mr. Van Cleef is that in the States it is chiefly among the miners and lumbermen that advanced Socialists are to be found, and not among the farmers. Now, in the lumber camps especially, conditions are very bad, and, apart even from this, the desire to settle upon the land seems to be so strong that the antipathy of the Finn to a state of society which forces him into uncongenial occupations like mining and lumbering or industry is comprehensible.

The author's practical conclusion is that in seeking to develop further the thinly-peopled regions of north-eastern Minnesota, the admirable qualities of the Finns as suitable settlers here should not be lost sight of. A possible wider deduction seems to be that a prudent immigration policy should be directed towards encouraging the various peoples among the immigrants to settle in those regions where their special qualities and traditions are most likely to render them useful members of the community.

Australasia.

Lord Howe Island.—In the *Transactions and Proceedings* of the New Zealand Institute for 1916, which has reached us recently, there appears an article by Mr. W. R. B. Oliver on "The Vegetation and Flora of Lord Howe Island," containing an interesting account of this isolated island and its rich flora.

Lord Howe Island is situated in lat. 31° 32′ S., some 270 miles from the eastern coast of Australia. It lies upon one of the two submarine ridges which extend from New Zealand to the islands of the tropical Pacific in a northerly direction. Of these one, the Kermadec Ridge, extends as far as the Samoan Group, and is bounded to the east by an unbroken expanse of ocean over 2700 fathoms in depth. The other ridge, which is broader, stretches from New Zealand towards New Caledonia and tropical Australia. Its western edge is comparatively high, a continuous ridge covered by less than 1000 fathoms of water stretching from the South Island of New Zealand to New Caledonia. Lord Howe Island is situated on the extreme western limit of this ridge, which is separated from Australia by a deep trough over 2000 fathoms in depth. The eastern edge of the ridge is more uneven, only rising to within 1000 fathoms in detached areas, one of which bears Norfolk Island. It is the presence of this ridge, suggesting a former connection between Lord Howe Island and New Caledonia and New Zealand, which gives special interest to the rich flora of the island.

The island itself is chiefly volcanic, the highest part, which rises in cliffs of over 2600 feet sheer from the sea, consisting of two much denuded mountain masses, the highest of which—Mount Gower—has a height of over 2800 feet. These two mountains seem to represent fragments of the original Lord Howe Island volcano. After its forma-

tion there appears to have been a long period of quiescence. A renewal of volcanic activity then resulted in the building-up to the north of the original volcano of a group of small volcanic hills, which have suffered relatively little from denudation. The two groups are connected by a level belt of ground consisting of marine limestone, the result being to give the whole island a crescentic shape. Its maximum length is about six miles and maximum width under two miles.

The climate of the island is insular in type, the temperature range being moderate and the rainfall ample (about 71 inches per annum). The winds are however strong, and the relative humidity is low. The effect of this is seen in the character of the vegetation, the forest trees showing water-conserving structures.

As would be expected from the latitude and climate, the typical plant formation is the warm temperate evergreen rain forest, agreeing, except in the absence of coniferous trees, with the rain forests of New Zealand and Tasmania. The trees have a general height of about 65 feet, and the forest is generally distributed over the island, save where elevation or exposure to salt spray causes it to pass into scrub. The upward range of this forest is about 2000 feet, and while in the lower part of its range a fig—*Ficus columnaris*—predominates, higher up a tree peculiar to the island—*Acacalyptus Fullagari*—is the chief species. The undergrowth is not dense, and consists largely of palms, screw pines (*Pandanus*), and ferns. Lianes are frequent, and form regular entanglements. Above about 2000 feet this high forest is replaced by low forest, called Moss Forest by the author, on account of the fact that the ground is covered with mosses, sedges, and low ferns. This association is reeking with moisture, and is rich in species. On the shore, owing to the exposure to the strong salt-carrying winds, the forest is replaced by a dense scrub, sometimes composed of entangled, low-growing shrubs.

The vegetation is very rich, over two hundred species of vascular plants having been described in a total area of under four square miles, and of these thirty-three per cent. are peculiar to the island. Further, there are no less than four peculiar genera. The plants show affinities with those of Australia, New Zealand, and Polynesia, but the author is of opinion that the Australian species owe their presence to trans-oceanic migration. On the other hand, the resemblances to the floras of New Zealand and New Caledonia are such as, in his opinion, to be explicable only on the hypothesis of a former land connection. He believes that the last connection was with New Caledonia, and that the submarine ridge mentioned above is evidence of a former direct land connection between New Caledonia and New Zealand *via* Lord Howe Island. From the characters of the plants of the island, he arrives at the conclusion that the land connection was broken with New Zealand earlier than with New Caledonia.

The paper, which is based upon an expedition to the island, is illustrated by some fine views of the scenery and vegetation.

Exploration in North-West Australia.—In March 1916 Dr. H. Basedow set out from Adelaide on an expedition to the far north west

of Australia with the primary object of investigating the supposed occurrence of tungstate ores there, and the secondary one of undertaking general exploration. The result of the mineralogical investigations seem to have been chiefly negative, but many interesting observations on the flora, fauna, and aborigines of the area lying between Ord and Fitzroy rivers were made. A general account of the journey appears in the *Proceedings* of the Royal Geographical Society of Australasia, South Australian Branch, vol. xxiii. The same volume contains a short report on the geology of the region and lists of some of the plants and animals collected. The anthropological observations are to form the subject of a separate paper. The general narrative is accompanied by a number of plates, the most striking of which represent aboriginal drawings; there are also some fine photographs of the aborigines themselves. We look forward with interest to Dr. Basedow's promised fuller paper on the natives and their customs, for his narrative shows that he had abundant opportunities for observation and took full advantage of these.

Of the plants met with Dr. Basedow gives a specially interesting account of the giant baobabs (*Adansonia*), which are abundant round Derby. One specimen found measured 75 feet in height, and had a girth of no less than 48 feet six feet from the ground. The trunk was bottle-shaped, and from it the branches hung downwards to the ground, covering an area of nearly a quarter of an acre with their shade. It seems often to happen that such large specimens develop a hollow at the top of the short trunk, some twelve to fifteen feet from the ground. In this water, dripping from the branches above, collects, and persists for some time after the close of the wet season. The fact is well known to the natives, who utilise the water-supply, being attracted to it by the presence of birds and insects. The tree also supplies edible nuts, relished both by the natives and by the bushmen, and the hard surface of the ripe nuts is carved by the natives with designs of the kangaroo, the emu, fish, and so forth, with considerable skill. These carved nuts find a ready sale among the inhabitants of Derby. The carving is done either with a knife or with a flint chip. Another less attractive plant, found to cover large areas near Derby, is a species of spear grass (*Heteropogon*). The grass stands 12 to 14 feet high, the stems being so close as to impede progress, and the air between stagnant and hot. The worst feature of the plant, however, is that its arrow-shaped seeds strike the body with their pointed, weighted end down, and work their way through the clothing into the skin, where they cause wounds which inflame and suppurate. Indeed, of his chief inland journey from Derby to the Napier and Paterson Ranges and back, Dr. Basedow does not give an attractive account; heat, mosquitoes, and other insects, and transport difficulties bulk largely in the descriptions. His later explorations were carried out from a small coasting vessel.

General.

Meteorology and the War.—The Annual Report of the Meteorological Committee for the year ending in March last contains some

interesting points in regard to present and probable future developments of the subject in connection with aviation. It is probable that, in connection with the Royal Air Force, a larger meteorological organisation will be found necessary. Meantime the forecast division has been largely reorganised, and there is now continuous attendance to meet the increased demand for information at various hours of the day and night.

The Meteorological Committee has also, by request, furnished the Ministry of Reconstruction with a report on the steps taken by the Committee with reference to post-war problems, in which they set forth the organisation necessary for completing the British meteorological service.

After pointing out that all the information required for climatological questions to supplement what appears in the daily weather report is left almost exclusively to private effort, the Committee in their memorandum said:—"Now that the weather is recognised to be of primary importance in so many of the affairs of life, and the requirements of so many departments of the Navy, the Army, and the Air Force include a knowledge of weather conditions not only at the surface in the various parts of the globe, but at elevations which have up to now been of interest to the meteorologist alone, some more comprehensive organisation is necessary, and it is felt that the steps towards this organisation cannot be postponed until after the war. While, on the one hand, the war makes the development of the organisation difficult on account of the difficulty of obtaining staff and materials for observatories and experimental work, yet, on the other hand, the war has shown the special importance of certain meteorological problems, the solution of which cannot await the conclusion of hostilities. One of these immediate requirements is the compilation in the easily accessible form of a book of the information that is at present scattered in scientific journals, and of which the existence is only known to a few experienced meteorologists. The Committee have had these requirements under their consideration, and have made proposals for dealing with them."

Economic Geography.

The French Colonies and the Castor-oil Plant.—One of the minor consequences of the war, and the associated development of aviation, has been a greatly increased demand for castor-oil. The oil, owing to its viscosity and other qualities, is greatly superior to mineral oils as a lubricant, and becomes more and more important as the aeroplane motors become more powerful and lighter. This use is not likely to diminish after the war, and, in addition, the oil can be put to a great variety of other uses. It is used in spinning, weaving, and dyeing, in soap manufacture, in the manufacture of leather and of celluloid, and so forth. Further, in addition to its use in medicine, it can be used for lighting, as a combustible in Diesel motors, and in China is employed, after removal of the active principle, as a food. It is, however, especially the first-named use which has made the demand for it great during the war, with a corresponding rise in price. France has felt the difficulty

of obtaining adequate supplies severely, and determined efforts are being made to promote and extend the cultivation of the plant in the French Colonies. These efforts are described in a long article, with two fine plates, by M. Henry Bérenger, which appears in the June-July issue of *Colonies et Marine*.

The castor-oil plant has a wide range in latitude, but as an economic plant it is limited by the fact that in the higher latitudes its seeds will not ripen, and that even in those temperate climates in which this normally occurs the yield of oil is inferior to that obtained in warm climates. On the other hand, as a medicinal plant it does best in temperate climates, the oil then obtained, though not of large amount, being of higher value. Generally, the plant may be said to require similar climatic conditions to maize, but with a greater amount of heat. In the south of France, where it was formerly extensively grown, it had disappeared before the war, except as an ornamental plant in gardens. It is now being planted on lands of low fertility, or those which, from any cause, cannot be utilised for more valuable crops. Thus it is being extensively sown on railway embankments. The greatest efforts, however, are being made to extend cultivation in the French Colonies. Of these only Indo-China before the war was a producer on any scale. It had a small export trade in the oil, which was sent to China. It is here, therefore, that developments have been most rapid. In the year 1917 the pre-war production was tripled; in 1918 it was multiplied by seven, while it is hoped that the crop for the present year will represent fourteen times the annual yield of the pre-war period.

In French North Africa, where the plant grows wild, its cultivation was not seriously undertaken till 1916. It is expected that the crop for the present year in Algiers will amount to 3000 tons, and to 5000 to 10,000 tons in Morocco. In Madagascar and French West Africa the plant grows freely, but before the war did not enter to any extent into external trade. Both countries are now beginning to develop plantations.

During the early years of the war Marseilles, the great centre of the French oil trade, was dependent upon British India for her supplies of castor-oil, and it was the stoppage of these supplies, as a result of war conditions, that made it necessary for France to look elsewhere for supplies. Since the refineries there are capable of dealing with a much larger amount of the oil than there is any immediate prospect of the French Colonies being able to produce, it is hoped to extend the cultivation of the plant throughout these, with a view especially to meeting German competition in the oil trade after the war.

NEW BOOKS.

EUROPE.

The Soul of Denmark. By Shaw Desmond. London: T. Fisher Unwin, 1918. *Price* 10*s.* 6*d.*

Mr. Desmond gives us a lively and outspoken picture of the character and *vie intime* of the Danish people. In the words of his preface, he "feels the

necessity of pointing out the failings as well as the virtues of his foster-mother for the good of the immortal soul in which she doesn't believe,' and tells her "what he conceives to be the truth in return for the kindest heart and most bounteous hospitality in the world."

He is indeed unsparing, though kindly, in his half-humorous criticisms of the Danish love of eating, drinking, and soft-living: of their *laissez-faire* in business matters: their lack of imagination and of what he defines as "temperament." He presents them, in fact, as an easy-going, pleasure-loving, materialistic people, but endowed with the positive virtues of straightness in dealing, warm-heartedness, and unbounded hospitality: as a secondary good quality may, perhaps, be attributed to them their love of and admiration for England and English ways. The Dane delights in paradox; he is in most directions a confirmed individualist, and yet in co-operation, as applied to agriculture and cattle-raising, he leads the world: the descendant of a race of fierce fighters, he is the greatest pacificist in Europe. The author considers that Denmark has gained yet lost in the war: "the golden war-rain has trickled through the highways and byways of little, simple Denmark," and her simplicity and naturalness are in danger of becoming infected by the vulgar ostentation of the war-plutocrat.

He also fears for her future: "She is about to emerge from her haven of ease into the stormy waters of competition," and will have to choose between the fierce struggle for the markets of the world or a return to the former sleepy and comfortable existence that is, perhaps, no longer possible in a war-changed universe.

GENERAL.

Seaside Planting for Shelter, Ornament, and Profit. By A. D. Webster. London: T. Fisher Unwin, 1918. *Price* 18*s. net.*

The reclamation of wastelands by the seaside has in this country not been carried out nearly so systematically as it has been in France, although the planting of trees and plants to fix the shifting sand dunes has been found of great national advantage. It is important to know the best trees and shrubs for exposed situations with poor soil, and how to plant and rear them successfully. The value of Marram grass for fixing the sand, and more recently of Spartina or Rice grass to promote the reclamation of mud flats, has been recognised in this country, and both of these hardy plants are referred to by the author. But the greater part of this beautifully illustrated and very attractively got up volume is devoted to the subject of the trees and shrubs that the author's wide experience has enabled him to discuss in an authoritative and useful way. He deals with sand dunes and coast erosion, the preparation of the ground and planting, the nature and conditions of tree-growth exposed to the salt spray and storms along the sea margin of these islands, the best kinds of trees and shrubs to plant for profit, shelter, or ornament, and concludes in Chapter xii. by giving useful lists of species more or less suited for seashore planting. There are so many common trees in these lists that the reader may feel a little bewildered and inclined to wish that the writer had also provided a black-list of trees to avoid as quite unsuitable for such purposes. But the author does well to arrange his trees and shrubs in three categories—1 such as can stand the first brunt of the storm; 2 such as require some shelter; and 3 such as must be well sheltered so as to thrive satisfactorily. The first category includes the maritime, Austrian, and

Corsican pines, evergreen oak, sycamore, Scots elm, thorn, laburnum, and grey poplar, which are considered the most hardy of the common trees for such exposed places. The second list includes among others the alder, ash, Huntingdon willow, mountain pine, Norway maple, and white poplar. The third contains, *inter alia*, the Scots and Banks' pines, birch, Mount Atlas cedar, black poplar, Thuya gigantea, and English maple. Whether all arboriculturists will agree with this classification may perhaps be a question, but the writer speaks from experience, and his advice must be respected. The value of seaside planting lies more in the shelter it affords than in the direct profit it is likely to yield, and as strong winds are the greatest enemies that trees have to face, it is not probable that any one desirous of growing a crop of useful timber will select an exposed coast for that purpose. A case is cited of £10,000 having been spent by Government in the north of Ireland by way of experiment on seaside planting which proved a complete failure. The illustrations, thirty-four in number, are all admirably done, and add greatly to an otherwise very useful and attractive treatise which will appeal to ordinary readers bent on beautifying and improving the countryside, as well as to specialists in forestry and rural development.

BOOKS RECEIVED.

Highways and Byways in Northamptonshire and Rutland. By HERBERT A. EVANS. With Illustrations by F. L. GRIGGS. Demy 8vo. Pp. xv + 367. London: Macmillan and Co., Ltd., 1918. *Price 6s. net.*

Poland: Her People, History, Industries, Finance, Science, Literature, Art, and Social Development. With numerous Maps. (An authorised English version of *Petite Encyclopédie Polonaise*, edited by ERASMUS PILTZ and compiled by E. WORONIECKI, S. S. ZALASKI, and J. PERLOWSKI.) Crown 8vo. Pp. xxvi + 416. London: Herbert Jenkins, Ltd., 1918. *Price 6s. net.*

Shrines in Alsace-Lorraine. By E. MARIANNE H. M'KERLIE. With Illustrations by the Author. Crown 8vo. Pp. x + 179. London: Sands and Co., 1918. *Price 4s. net.*

With Pen and Rifle in Kishtwar. By OTTO ROTHFELD, F.R.G.S. With Illustrations. Crown 8vo. Pp. xi + 177. Bombay: Taraporevala Sons and Co., 1918. *Price 4s. 8d.*

Roving and Fighting. Adventures under Four Flags. By Major EDWARD S. O'REILLY. Illustrated with Photographs. Demy 8vo. Pp. 354. London: T. Werner Laurie, Ltd., 1918. *Price 11s. 6d.*

British Rainfall, 1917. By HUGH ROBERT MILL and C. SALTER. Fifty-seventh annual volume. London: Edward Stanford, 1918. *Price 10s.*

Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1917. Vol. II. London, 1918. *Price 4s. 6d. net.*

Statistical Abstract relating to British India from 1905-6 *to* 1914-15. London, 1918. *Price 1s. 3d. net.*

Colonial Reports (Annual). Falkland Islands (963); Seychelles (964); Weihaiwei (965); Fiji (966); British Solomon Islands (967); Grenada (968); Turks and Caicos Islands (969); Northern Territories of the Gold Coast (970).

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

Reproduction of an Anonymous Italian Map of Scotland, *cir.* 1560-1570. Presented by Michael C. Andrews, Esq., F.R.S.G.S., Belfast, to the Royal Scottish Geographical Society. The original measures 13·6 × 10·5 ins. between border lines (35·0 × 27·0 cm.) and is on the scale of 40 miles to an inch.

This is the first known Map of Scotland printed separately, but it is merely copied from the Map of Britain by Sebastian Re. Issued at Rome 1558.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE EARLY MAPS OF SCOTLAND—PART III.

By Harry R. G. Inglis, F.S.A.Scot.

WITH NOTES ON THE EARLIEST-KNOWN PRINTED MAP OF SCOTLAND. By Michael C. Andrews, F.R.S.G.S.

(*With Folded Map and Sketch-Map.*)

A most interesting direct result of the announcement of the scheme for forming a National Collection was the discovery of a map of Scotland previously unknown. As mentioned at the Annual Meeting, the Society is greatly indebted to Mr. Michael C. Andrews, F.R.S.G.S., of Belfast, for so generously handing over to the Society the only known copy in Britain of this map, and in order that it may be made available to the general public, the Committee in charge of the Collection reproduce the map this month, in fulfilment of their promise to those who have so generously supported the scheme.

The special feature of this anonymous Italian map (*circa* 1560-70) is that, so far as is known, it is the earliest *printed* map of Scotland issued separately. Earlier printed maps of Britain are known, but this is the earliest record we have of the engraving and issue of a separate sheet for Scotland.

Mr. Andrews has written a full account of the map in a manuscript dealing with the Early Maps of Scotland, and has gone over its points fully and methodically. With his permission, the account printed on pages 43-46 has been extracted from the fuller description. Mr. Andrews deals with and presents information not hitherto made public relating to the maps of Italian geographers, as he has had access to continental sources not previously made use of.

Perhaps it may be desirable to preface Mr. Andrews' article by a

summary of the period at which this Italian map was produced. The Republic of Venice had passed the zenith of its prosperity, owing to the breaking of its monopoly of the traffic to the East by the Portuguese through their discovery of the Cape route to India. In its high-handed effort to regain lost trade, Venice was incurring the resentment of the rest of Italy. The Turks were slowly pushing their way, capturing island after island from the Venetians, and the balance of power in Europe between France, Spain, and Austria as to the kingdoms of Naples, Tuscany, and Milan, together with the Papal fears as to the greater preponderance of one or other, rendered the position of Italy one of anxious foreboding. Yet in Art, in the beautiful colouring of Titian and the work of Tintoretto, the Italians manifested their real greatness. In Scotland the Reformation had passed, and the tragedy of Mary Queen of Scots was working itself out, while in England the energies of the wonderful Elizabethan Period, with its navigators, adventurers, and *literati*, were in full swing, and Chancellor had just discovered the route to Archangel.

Yet it was just at this period that the Italian geographers were the leaders of the geographical world, and we see from Mr. Andrews' list of maps issued by them, that map after map of the British Isles was issued by the different publishers. What appears to have been the first printed map of Britain, by George Lily, an Englishman, was issued in Rome in 1546, and it was not till 1570 that the Dutch geographer Ortelius wrested the pre-eminence in map publishing from the Italian States.

Reviewing what we know of the maps that must have been in use in the 1560-70 period, to which Mr. Andrews' map belongs, it is certain that four, if not five, variations in the outline of Scotland came into use between 1540 and 1590. We cannot conceive that these foreign geographers obtained their information elsewhere than from maps published or issued in this country. In every case certain well-defined features make each map perfectly distinct from the others, and show that a fresh source has been available.

Thus, in 1546 appeared Lily's Map of Britain published in Rome, giving the outline of Scotland that is shown in the map illustrated in this issue, the most marked feature of which is the conjoined island of Lewis and Skye at the north-west corner. This outline of Scotland was followed implicitly by the Italian geographers for the next twenty-five years at least. After this came the Mercator (German-Dutch) outline in 1564, the most distinctive feature of which was the small island of Rona between the Hebrides and Cape Wrath. Then came the (French) Leslie outline in 1578, which had almost the same outline as Mercator for the East Coast, but a totally different one for the Hebrides and Western Islands. In 1583 there was issued a French Chart (Nicolay) featuring to some degree the general appearance of Mercator's map, but with an almost perfect representation of the Black Isle and Cromarty Firth, a century ahead of any other map. Finally, in or about 1584, the Dutch charts of our coasts by Waghenaer show a deep bay at Aberdeen, and other features resembling no other map of Scotland, making clear that still another original had been worked from, even although

the work of the geographers above named had been before the draughtsman. These facts clearly prove that the Italian, German, French, and Dutch geographers had access to maps of Scotland that we are quite ignorant of to-day, which they decided to use in preparing their work.

NOTES ON THE EARLIEST-KNOWN PRINTED MAP OF SCOTLAND.

By Michael C. Andrews, F.R.S.G.S., Belfast.

The map of Scotland reproduced here from the print formerly in the writer's possession, and now in the Society's National Collection of Old Maps of Scotland, appears to be rare. The only other example at present known was offered for sale some years ago by Herr Karl Hiersemann of Leipsic for £24, but its present location is unknown. His copy was from the same plate as the present example, but in an earlier state, before the insertion of the title "Scotia." The outline and mountains were rather heavily coloured by hand, thus obscuring some of the names, whereas this map is exactly in the state in which it was taken from the plate, all place-names being perfectly clear.

The antiquarian Signor Leo S. Olschki of Florence, from whom I obtained this example, described it in his Catalogue LXL., No. 1508, as "Tavola nuova del 'Regno di Scotia,' Carte Géogr. Grav., sur cuivre 27 × 35 cm. S. L. ni D. vers 1560. Carte remarquable sans doute exécutée par un des célèbres géographes Italiens de la moitié du XVI. siècle. Elle appartient probablement à l'Atlas célèbre de Lafreri. Non citée par Nordenskiöld."

On what grounds Signor Olschki dated this map *circa* 1560, I have not been able to ascertain, but it was probably on account of his estimate of the general appearance of the plate, and some weight must be given to the opinion of an experienced antiquarian, even when not based on particular investigation.

That the map comes from the collection known as the Roman Atlas of Lafreri, as suggested by Signor Olschki, has not been proved by any investigations I have been able to make. The map probably formed one of a bound collection which Signor Olschki has broken up for sale, as it bears marks of having been sewn up, curiously enough, at the right-hand side. A number of other maps of about the same size listed in the same catalogue, with similar descriptions and ascribed to the same date, appear to have been contained in the same collection. This suggestion is, to some extent, confirmed, as one other example which I bought at the same time (No. 1522, Isole di Irlanda, Scotia, et Inghilterra) bears exactly the same marks of sewing and has the same watermark.

I have failed to identify this watermark satisfactorily, but Mr. Dodgson of the British Museum Print Department has had the kindness to inform me that a very similar mark, but without the surmounting crescent, is assigned by Briquet (No. 4834) to 1556-75, and described

as Veronese. This evidence, together with the use of the particular type of windrose, all seems to point to the sixth decade of the sixteenth century being a probable date.

Description and Appearance.—The map is enclosed in a plain frame,[1] measuring $10\frac{1}{2} \times 13\frac{5}{8}$ (350 × 270 mm.). The title "Scotia," is placed in the top left-hand corner, and is enclosed in a slightly ornamented frame. Another title "Regno di Scotia," runs right across the map midway from the top and bottom. In the bottom right-hand corner is a scale of 20 miles, divided into six sections of 20 miles each, and marked "Scala di Miglia." The scale is 40 miles to one inch.

Some distance above this scale is a windrose or compass card of eight points, with a black spear head or pointer which rises from the centre, instead of a fleur-de-lis. The points are lettered with the initials of the winds as used by the Italians.

T for Tramontana	= North.
G for Grecco or Grecale	= North-east.
✠ Christian sign	= East.
S for Sirocco or Scirocco	= South-east.
O for Ostro	= South.
A for Agricus (Lat.)	= South-west.
P for Ponente	= West.
M for Maestro or Maestrale	= North-west.

Windroses of this type but usually of sixteen or thirty-two points, were commonly used by the Italian map-makers during the sixth decade of the sixteenth century, viz. :—

Jacopo Gastaldi, .	1561, 1562, 1564.
Paolo Forlani, . .	1562, 1566.
Domenico Zenoi, . .	1567.
Ferrando Berteli, *circa*	1560 and 1565.

There are no ships, sea monsters, coats of arms, nor other ornaments such as are common in early printed maps. The map is placed in the modern way, with the north to the top. It contains the whole of Scotland and the Western Islands, and extends far enough north to include the whole of the Orkney group and the island of "Hirtha" (St. Kilda). In the south it includes the northern parts of Northumberland and Cumberland to the river Tyne (Tinaf.), and Carlisle (Carleolum), marked "parte d' Inghilterra," and a large part of Ulster (Hvltonia).

The form given to Scotland is a considerable improvement on that in Mercator's Map of Europe, 1554, and in the MS. Map of the British Islands, dated *circa* 1534 (Brit. Mus. Cott. Aug. I. 1. 9). It is also better than in the printed map of Great Britain, probably by G. F. Camotio, *circa* 1572 (Stockholm Kungl. Bibl. in a collection of maps entitled "Isole famose," etc.), and in the anonymous map of the British Islands, printed probably at Venice, *circa* 1560 (Brit. Mus. S. 10 (1) No. 8), all of which are very different from each other. The shape given to Scot-

[1] To the outside border or plate-mark, the inner border measures $10 \times 13\frac{3}{16}$.

land, however, is not nearly so good as that adopted by Mercator in his Map of the British Islands, 1564, which was subsequently copied by Ortelius, 1573. Although it is hardly correct to compare a map of the Continental type, like our present example, with those of the marine cartographers, it may perhaps be noticed that the form given to Scotland in some of the later work of that prolific map maker Baptista Agnese, though on a very small scale, is almost as good. (Venezia Museo Civico Correr Port, No. 21, Tav. 8, dated 1553; Venezia R. Bibl. Marciana Cl. IV. Cod. 6, No. 62, fol. 26a, dated 1554; Brit. Museum, Add. MSS., No. 25,442, Map 2, dated 1564.)

Lily's Outline of Britain as used by the Italian geographers.

The Solway Firth and the coasts of Galloway are fairly drawn, as is the Firth of Clyde, but the Peninsula of Cantyre is much enlarged and of bad shape. The Island of Arran is much elongated. The general trend of the coastline to Cape Wrath is fairly correct, but the Western Islands show little accurate knowledge. They appear as a confused mass of islands of various sizes, mostly unnamed, and in bulk disproportionately large compared to the mainland. They are, moreover, placed much too far north.

Probable Source.—A careful examination and comparison of the series of nine early printed maps of the *British Islands*, 1546-89, is necessary to establish the relationship which exists between this map and them, and to determine, if possible, from which example it has been copied.

The series of maps are—

No.	Date.	Place.	Author.	Reference.
1	1546	Rome,	G. L. A. (George Lily),	Brit. Mus. K. 5, 1.
2	1549	Antwerp,	Joannem Mollijns,	Paris Bib. Nat. Cartes, No. C. 9823.
3	1555	London,	T. Gemini,	Do. do. do. Bf. XII.
4	1556	(? Rome),	I. H. S.,	Brit. Mus. Maps, S. 10 (2).
5	1556	Venice,	Andreas Valvassorus,	Do. do. 1080 (50).
6	1558	Rome,	Sebastianus a Regibus,	Do. do. S. 10 (1), No. 11.
7	1562	Venice,	Ferrandi de Berteli,	Do. do. S. 10 (1), No. 10.
8	1563	Venice,	Camotio MR.	Do. do. S. 30 (2), No. 6.
9	1589	Rome,	Marcus Clodius,	Do. do. S. 10 (1), No. 9.

Two of these maps, (Nos. 2 and 5), are printed from wood-blocks,

while the remaining seven are all from copperplates, and are good examples of the beautiful cartographical execution which characterised the Italian school at this period. They are all dated, and the place of publication indicated on all except No. 4. The author's or engraver's name appears on seven out of the nine. The earliest example has been attributed to the famous map maker Jacopo Gastaldi, but Mr. Chubb's[1] discovery of the initials G. L. A., with the sign of three lilies and an angel's wing, identifies almost with certainty the author as George Lily. No. 4 bears only the monogram I. H. S., which, though suggesting an ecclesiastical origin, leaves the authorship unsettled.

A comparison of our map with the representation of Scotland in these nine examples reveals such a close resemblance in form, and such a coincidence in the place-names employed, as to leave no doubt that all are closely related.

[Here follows a very technical and careful examination of names wanting in certain of these maps, peculiarities of spelling, etc., set out in comparative tables side by side, which clearly narrows the investigation to only one of two maps being possible as the original—the map of 1558 or 1589. Mr. Andrews then concludes by pointing out that "the place-names give good grounds for preferring the 1558 map as the possible original rather than the 1589 example, especially as only one name has been found which would indicate the contrary." I fully endorse Mr. Andrews' opinion, as the engraving of the outline on this map of Scotland indicates that it could not have been copied from the 1589 map, but only from the 1558 map by Sebastian Re.—H. R. G. I.]

TRAVEL MEMORIES.[2]

By Lieut.-Colonel A. C. Yate, F.R.G.S., F.R.Hist.Soc.

(*With Illustrations.*)

In note 1 on page 299 of the August 1918 number of the *Scottish Geographical Magazine* I mentioned having come across a copy of the privately printed Diary, translated from Persian into English, of Najaf Kuli Mirza, who, with his brothers, Razā Kuli and Taimur Mirzās, had in 1836 sought refuge in England. I have recently discovered that the sculpture, which I, with a naive simplicity, which I regret, and for which I now seek to atone, described (p. 261 of the June 1917 number of the *Scottish Geographical Magazine*) as "*said* to represent Taimur-i-lang, *alias* Tamerlane," represents nothing more than the Taimur Mirzu above-named, one of thirty sons of Husain Ali Mirza, son of Fath Ali Shah, and uncle of Muhammad Shah. The last-named, by the premature death of his father Abbas Mirza, was promoted to the Governorship of Azerbaijan, with headquarters at Tabriz, and on the death of his grandfather Fath

[1] Map Curator, British Museum.

[2] Continued from vol. xxxiv. p. 410.

Ali Shah, became the rightful heir to the throne. This claim, however, Husain Ali Mirza contested, until his army was defeated in 1835 near Kumeshah by Muhammad Shah's army commanded by Sir Henry Lindesay-Bethune of Kilconquhar in Fife.[1] As the sequence of that defeat Husain Ali Mirza, Governor-General of Fars (the post held by the Zill-us-Sultan in 1881), was taken prisoner at Shiraz, and removed to Teheran, where, his health breaking down, he died. Death in this case does not seem to have been hastened by artificial means, despite the harrowing description which Mr. Binning (*Persia*, vol. i. p. 293 *n.*) gives of episodes in Persian royal circles on the demise of the Crown. "Le Roi est mort! Vive un tas de Rois" is the *mot d'ordre* in Persia, as we know very well, until fortune declares for one and consigns the rest either to the grave, lifelong blindness, mutilation, or imprisonment. The three young refugees in England, as a set-off doubtless to the fate of those who were caught in Persia, were "lionised and fêted," and, adds Mr. Binning, in a justifiably satiric vein, "subsequently pensioned." When Mr. Binning was in Shiraz in 1850-51, not a few of these young scions of royalty were still to the fore, and having, it would seem, nothing to occupy them in earnest, took to evil ways, and were at times subjected by the Governor to the indignity of the bastinado. My sculpture at the foot of the Kotal-i-Dukhtar turns out, then, to represent, not the great Taimur-i-lang, but the very commonplace Taimur Mirza, who, prior to his father's rebellion in 1835, was Governor of Kāzrūn. My mistake is much more likely to be due to my (in 1881) very limited knowledge of Persian, and not to any misstatement on the part of our chārwadār (muleteer) or attendant. Men so familiar with the Bushire-Shiraz route would know all about Taimur Mirza and his wayside sculpture at the foot of the Kotal-i-Dukhtar.

As intelligence from Persia has, throughout the past four and a half years, been but meagre, and the obligation of correcting an absurd error has carried me back to the Bushire-Shiraz route, it is not amiss to note in the latest despatch from Teheran, dated 19th December 1918, such passages as: "As soon as the Bushire-Shiraz road is opened and rendered secure, and local conditions permit"; and again: "The joint military measures for the reopening and restoring of the Bushire and Shiraz trade-route are progressing." It is evident that the presence of British troops and of the South Persia Rifles, the extension of the railway from Nushki to Mirjāwa, and the employment of British officers and British forces to keep watch and ward over the Perso-Baluch and Perso-Afghan frontiers have done little more than maintain in the provinces of Fars and Kirman some check upon the general anarchy. Already there is talk of transferring the South Persia Rifles to the Persian Government, which owes everything in this war to Britain's protection, and has shown its gratitude for that protection by curtly repudiating the Anglo-Russian Convention of 1907 (a farce as regards the Russia of the moment), sending deputies to Brest-Litovsk and

[1] Vide Conolly's *Eminent Men of Fife* (1866), s.v. Bethune, and Burke's *Peerage*, s.v. "Lindsay, Earl of."

Berlin, and making so little effort to defend itself that our army of the Tigris had to safeguard it against both Turk and Bolshevist. British forces controlling the Trans-Caspian Railway from Krasnovodsk to the Oxus guard Persia's northern frontier, while the resuscitation of the Georgian and Armenian States creates buffers respectively between Persia and Russia and Persia and Turkey. An Armenia embracing Trebizond and Ardahan on the north, and Mersina and Alexandretta on the south is a resurrection indeed which only the decisive victory of the Allies enables us to contemplate.[1] The inclusion of Alexandretta in the State of Armenia may prove a judiciously peaceable method of reconciling rival European claims. The deliberate Turco-Teutonic effort to annihilate the Armenian race threatens this "Armenia" with a lack of population. Will the Isfahani colony return to the land of its fathers?[2] My own impression is that a capably governed Armenian State will attract many Europeans. The great trade-routes of the past have centred in that area, passing north or south of the Taurus range, and there are signs that they will again centre there. A British Levant Company has been revived;[3] and it will be strange if the traditions of Venice and Genoa and Marseilles do not tempt others to re-engage in a trade which brought great wealth to Mediterranean ports in the days prior to Vasco da Gama and Albuquerque. Great in those days was the prosperity of Aleppo, the principal emporium of trade between Europe and Asia, when the great caravan routes of the Middle Ages all converged upon it; and greater yet will be its prosperity when the transcontinental railways of the three continents of the Old World, not to mention air-routes, meet and intersect there. Alexandretta is the port of Aleppo, and as such invaluable. Possibly it should be internationalised. Lord Bryce, Sir Valentine Chirol, and *The Round Table* believe that the intervention of the United States of America will conduce to the future well-being of the Turkish Empire. Lord Bryce would entrust to them Armenia, Sir V. Chirol Constantinople and the Straits, and *The Round Table* Asia Minor generally. This problem is not for detailed discussion here. Suffice it to quote the late Mr. Theodore Roosevelt's succinct and straightforward comment of the 26th December last: "We (the U.S.A.) ought not to undertake the task of policing Europe, Asia, and Northern Africa." When we consider the part played in this war by the Allied Powers, and especially by Britain, in the Mediterranean, in and around Egypt, in Palestine, Syria, Mesopotamia, and Persia, at and around the Dardanelles, and finally on the Black Sea and the Caspian, we may well ask, "Is all this toil, the experience thus gained, to count for nothing? Are the U.S.A. to be empowered to absorb the commercial, political, and strategical advantages won by (mainly) British arms? It is with some compunction that I revive the memory of Morgan Shuster's failure in Persia in 1911; but at the present crisis, the Old

[1] Vide *Times*, 31st December 1918, p. 7.

[2] Binning, *Persia* (vol. ii. p. 89), writes in 1851: "There is little doubt that, if it were possible, the entire population of Julfa would at once quit for ever the inhospitable dominions of the Shah."

[3] Vide *Times*, 12th December 1918, p. 3, and *Quarterly Review* for October 1918.

World must play second fiddle to none. The aphorism *Ne sutor ultra crepidam* has not yet out-*lasted* its time. Let the U.S.A. patch up Liberia!

It was not till years after I visited Ispahan in 1881 that I picked up and perused the *Lettres Persanes* of Montesquieu, and the *Persian Letters* of George, first Lord Lyttelton, addressed by "a Persian in England to his friend at Ispahan," have but recently come to my knowledge. The latter, which first appeared in 1735, were undoubtedly inspired by the earlier and much more fascinating work of Montesquieu, and, though they fall far short of their original in diversity of charm, are effective as a satirical comparison between British and Persian views of life. Let me refer to Selim's seventy-third letter from London to Mirza at Ispahan, in which he devotes himself to an eulogy of the French cook. "Italy produces the best *singers*; England the stoutest *boxers*; Germany the profoundest *theologians*; and France is incomparable for its COOKS. This last advantage carries the palm from all the rest; and that nation has great reason to be proud of it; as a talent of universal currency, and for which all other countries do them homage: on this single perfection depend the pleasure, the magnificence, the pride, nay, the reputation of any court in Europe; without a good French *cook*, there is no ambassador can possibly do his master's business, no secretary of state can hold his office, no man of quality can support his rank and dignity." It has always been my feeling that the Persian is essentially the Frank of Asia. The Persian *cuisine* is not unworthy to rank with the French, and the *lingua franca*, the diplomatic language of Asia, is Persian. The Persian is a delightful companion and conversationalist, as Mr. Binning, in his most readable narrative of his travels in 1850, bears witness, and the Frenchman no less so. In Mr. Binning himself we discern not merely the traveller—an individual whose literary attempts can be only too dull—but the scholar, the archæologist, the keen observer, and the man of artistic taste, even down to the culinary art. His description of the Persian boiling of rice is as elaborate as his essays on the odes of Hafiz, the antagonisms of the Sunni and the Shi'ah sects, or the moral depravity of the Persian character, and perfectly convinces the British reader that he will never taste rice cooked to perfection within Albion's shores. As travellers both Mr. J. Scott Waring (1802) and Mr. R. B. Binning (1850) show an intimate knowledge with the Persian language and literature, but in familiarity with the people, their customs, mode of life, history, religious faith, and general tone of thought and habits, the advantage distinctly lies with Mr. Binning. Mr. Scott Waring devotes the last section of his quarto volume to the history of Persia from the death of Karim Khan Zend to the subversion of the Zend dynasty, in the person of Lutf Ali Khan, by Aga Muhammad Kājār; and Binning concludes his first volume by a comparison between Lutf Ali Khan and "bonnie Prince Charlie," decidedly to the advantage of the Persian claimant to the throne. I quote his words:—"The military talents of Lootf Alee Khan[1] were great, his courage

[1] I give Binning's spelling.

indomitable, his conduct under misfortune was noble and dignified, and his heroic fortitude in bearing up against the most disastrous calamities has never been surpassed. Charles Stuart was, by all unbiassed and authentic accounts, a very indifferent soldier, deficient in firmness and resolution; and his bravery in the field is at least very doubtful." Mr. Scott Waring, writing fifty years earlier, eulogised Lutf Ali equally, adding, "Were I to compare his character with any European monarch, I would prefer our English Richard's to Charles the Twelfth's"; and Sir Harford Jones Brydges, who knew the last of the Zends personally, wrote: "My respect, admiration, and love for this true Lion of War were such at that time, that I would cheerfully have devoted my life to his service." In these days, when Persia and the Persians are, deservedly, at a discount, let us recall and respect the memories of heroes of a century and more ago. In cool effrontery the present Persian Ministry seems by no means wanting, and Britain, having saved the country, will do well to hold it with as firm and stern a hand as the Allies propose to lay upon some of our late enemies. Premature talk about Persia's "independence" is at present uncalled for.

Let me now complete my reminiscences of the sights of Ispahan :—[1]

"The 'Chihal Sitún,' or 'Forty Pillars,' is a reality rather in name and imagination than in reality—in fact, an optical illusion. Count the pillars, which are of wood, and were once encased in a diamond-shaped design of mirror-glass, and you will see but twenty; then turn round and gaze on the face of the tank full of clear water that lies facing the portico and you will see these twenty pillars reflected. Thus, and only thus, can you behold and realise your 'Forty Pillars.' Passing under the portico, one enters a small hall, the walls of which display the remains of ornamentation in glass-work and painting. I may mention that on the outside of this edifice, on the north and south sides, the walls are covered with a number of paintings, intended to represent Europeans, both male and female, of that period. In point of artistic skill they are exceedingly faulty, and the lavish display that the ladies make of their charms is a libel even on the European courts of the sixteenth and seventeenth centuries. These paintings were probably executed either in the reign of Shah Abbas (a contemporary of our Queen Elizabeth), or at some date coeval with our Stuart dynasty. The principal hall is a very fine domed chamber, the roof of which is adorned with gorgeous designs in gold and a variety of other colours, while six large frescoes, representing historical incidents (battles, regal banquets, councils, etc.), decorate the walls, not to mention a large number of smaller paintings, the meaning of which we had not time to decipher, even if our cicerones were capable of enlightening us on the point. In the six large frescoes figured Shah Abbas the First and Second and other Persian monarchs of the Safavi dynasty. Humayun, Emperor of Delhi, Nadir Shah, and Isma'il Khan are also said to figure in these paintings. In the banqueting scenes the dancing girls form a

[1] What follows is from my Diary of 1881, continued from p. 410 of *Scot. Geo. Mag.* for Nov. 1918.

The "Chihal Situn" Palace at Ispahan, 1885.

prominent feature. The study of these paintings from an historical and social point of view would have been most interesting had we but had the leisure.

"Leaving the 'Chihal Sitún' (it is in a sad state of disrepair), we returned to our horses, and, mounting, rode to the Maidan-i-Shah, the Champ-de-Mars of Ispahan, which is a large rectangular space, surrounded on every side by barracks, occupied by the regular troops of the Persian army, by covered bazars, and several mosques. It is here that the troops are drilled. The uniform of most of the soldiers was dark blue, with scarlet facings. I noticed a Persian officer dressed in a uniform very similar to, if not identical with, that of the Austrian infantry. At the

A Coppersmith's bazar at Ispahan, 1885.

north side of the Maidan-i-Shah we passed a large gateway adorned with three large frescoes. Two of them represent Persian hunting and battle scenes.[1] The third represents a Feringi convivial meeting, in which the familiarity that appears to exist between the ladies and gentlemen is not such as is witnessed in conventional society. This painting is said to be about two hundred years old. Passing out of the Maidan-i-Shah, we traversed a long series of covered bazars, each section of which was occupied by the artisans of particular trades, as hatters, tailors, carpenters, iron and copper smiths. One portion of this bazar was completely deserted, although it was architecturally much finer than the rest, its walls betraying traces of old frescoes. Emerging from the

[1] On Persian hunting, see Ebers' *Egyptian Princess*, vol. ii., note 10, and Rawlinson's *Ancient Monarchies*, vol. iii. pp. 226-8.

bazar, we wended our way down a fine avenue bordered with splendid chinars (plane-trees), till we reached the most easterly and the finest of the four bridges that cross the river, connecting Ispahan with Julfa. This bridge[1] is constructed of solid brick-work, and is very similar to the Pul-i-Allah-verdi-Khan, which we crossed on our way to visit the Zill-es-Sultan. The eastern bridge, however, is in better repair, architecturally of better design, and more elaborately ornamented with painted tiles. Beneath it is a dam of solid masonry, over which tumble the waters of the river down a long flight of steps, thus producing a pretty little cataract. On the south or Julfa side of the river, slightly to the west of this bridge, stands the old palace of 'Haft-dast' (Seven-hands), near which also we remarked the remains of a fine old edifice (the Aina-khāna) that bore a close resemblance to the 'Chihal Sitún.'[2] On the broad and placid stretch of the river, just above the dam, the Zill-es-Sultan occasionally holds a *fête* (nocturnal), when processions of boats, fireworks, and illuminations change the natural sameness of the locality into a temporary fairyland; not, indeed, rivalling the scenes of the Grand Canal at Venice when *en fête*, but quite in harmony with the Persian love of wood and water.

"From this point we rode through walled gardens and orchards (occasionally plucking luscious red mulberries from the boughs overhanging the lanes), back to Julfa, where we arrived about 11 A.M., after a warm peregrination of four hours. The general appearance of Ispahan is anything but suggestive of prosperity. A native told me that he believed that nine-tenths of Ispahan was deserted and in ruins. The population is now said to be about 70,000, and in its most palmy days under the Safavi dynasty to have been about half a million. One notices a vast number of ruined houses and edifices, partly the result of the depopulation and disaster caused by the famine that prevailed throughout Persia some eight or nine years ago. In the Madrasa opening off the avenue of Shah Abbas there did not appear to be any students. Many parts of the bazar were deserted and in ruins. It will be many years before the country recovers from the terrible effects of that famine.[3]

"In the evening we took a stroll round the environs of Julfa, and entered several of the finest private orchards that we saw, as the gardeners expressed no dislike to our intrusion. The owners of these gardens generally visit them on their holidays and at other times of leisure, and hold *alfresco* picnics there under the shady trees. Plums, cherries, peaches, apricots, nectarines, grapes, mulberries (white and red), apples, pears, and pomegranates, grow in great profusion in these orchards; in fact, fruit here is almost a drug in the market, although not to compare in excellence of quality with the same fruits as grown in Europe, and especially in England. One remarks to the south-west or

[1] Pul-i-Khāju, *v.* illustration. *Scot. Geog. Mag.*, Nov. 1918, p. 404. Still east of this is the Pul-i-Shahristān; *vide* Curzon's *Persia*, vol. ii. pp. 44-50, for a thoroughly good description of the five bridges of Ispahan, also Binning, chap. xxvi.

[2] *Vide* Curzon's *Persia*, vol. ii. p. 48, and Binning's *Persia*, vol. ii. pp. 143-4.

[3] *Vide Scot. Geog. Mag.*, Aug. 1918, p. 301.

west of Julfa a high hill surmounted by an edifice known as the Takht-i-Rustam. This we had not time to visit. Most ancient buildings in Persia seem to bear the name of Rustam, Jamshid, or Suleiman.

"In the evening a number of the European residents at Ispahan met us at dinner at Mr. Hörnle's, and, sensible as we were of our host's kindness and hospitality, obliged us to sit up to a much later hour than we liked: for we had to rise about 3 A.M. on the 14th, in order to start before daybreak *en route* for Tehran. So, after some two hours' slumber (from 1 to 3 A.M.), we were roused from our beds, and, reluctantly turning out, got our kit together and loaded, and mounting our horses departed, Mr. Hörnle very kindly getting up to see us off and bid us 'God-speed.' We had the previous day been to the post-house in Ispahan, ordered our horses, obtained our permit to travel by post, and paid our fare in advance for several stages, receiving passes to be delivered to the chapparchis at each stage. The postal system in Persia is as yet very indifferently organised. Only between Tehran and Tabriz can it be said to be fairly well managed. That route as far as Kazvin I will hereafter describe.[1] Starting at 4.30 A.M. from Julfa, we rode for some four miles through the city, traversing a succession of narrow streets and covered bazars, and at 5.30 emerged into the open country, and then, breaking into a steady canter, we reached Gaz about 6.30, the total distance from Ispahan being thirteen or fourteen miles. The country we passed through was well cultivated, abounding in orchards and fields of grain, opium, and other produce, and studded with pigeon-towers, villages, and buildings, inhabited or uninhabited. Of water there was no scarcity. We met Mr. Glover, a telegraph inspector, travelling with his Armenian wife and his family to some station between Ispahan and Tehran. Mr. Glover's reputation as spinner of yarns was well established, and during the twenty minutes which, while changing horses, we passed in his company, he lived up to it vigorously. There is a *kārwān sarāi* at Gaz, and we also passed one at Madar-i-Shah, about four miles short of Murcha-Khwār. At the latter there seemed to be no water, but extensive ruins lay around it. The town of Gaz is of considerable size, and encircled by high walls. Leaving it about 7 A.M., we covered the twenty-four miles to Murcha-khwār by 9.30. The intervening country showed but few signs of cultivation, and we passed only two streams of indifferent water. During our travels through Persia in June and July we were generally glad to drink at every stream we met, consequently we had every chance of judging of the merits of the water. Between Gaz and Murcha-khwār we passed many 'kanāts'[2] leading towards Ispahan. Pigeons abounded. At Murcha-khwār there is an abundant supply of good water, and consequently a considerable area of orchards and tilled lands surround the village, in the centre of which stood a fine residence, girt with high walls, seemingly

[1] Motor transport is now transforming Persian roads. See Lieut.-Col. G. F. S. Napier in *The Geographical Journal*, Jan. 1919. What with cars, aircraft, and railways, Persia a few years hence will hardly know herself, and equally so Afghanistan.

[2] Underground water-courses. *Vide* Binning, vol. ii. pp. 171-3.

the abode of some Persian of rank. Amid the distant hill ranges we noticed three or four high peaks, the dark slopes of which were furrowed with streaks of snow glistening in the sunlight. As Soh, our resting-place for the night, was only some 25 to 30 miles distant, we stayed at Murcha-khwār till 3 P.M., and were glad of a few hours' sleep as a compensation for our loss of rest on the previous night."

I would conclude this with a quotation which corroborates what I wrote in the *Scot. Geog. Mag.* for October 1917, *à propos* of *Hajji Baba* and *Gil Blas*. The passage, taken from Binning's *Travels in Persia* (1850-51), p. 123 of vol ii. :—

"Morier's inimitable *Hajji Baba* is a perfect portraiture of an Ispahanee, and of a Persian in general—a man possessed of great capacity, shrewdness, and intelligence, and gifted by nature with warm and kindly feelings—one who, if properly reared, would be an honourable and estimable member of society; but who, breathing from his earliest infancy an atmosphere of villainy, selfishness, and fraud, under the debasing influence of his country's manners and government, has degenerated into a mere good-humoured rascal: *Hajji Baba* is by far the best book of the kind that was ever written. It has been compared with *Gil Blas*, but, in my humble opinion, is much superior. Le Sage possessed not half the exquisite humour, nor the skill in showing off human nature, which Morier has exhibited in this admirable story. I must admit, however, that no one unacquainted with Persians can fully appreciate *Hajji Baba*; and perhaps my ignorance of the Spanish people may render me blind to some of the merit of *Gil Blas*."

SOUTHERN FORFARSHIRE: A REGIONAL STUDY.[1]

By Blanche Hosgood.

V.—Climate.

In considering the climate of this district there are three general points to be borne in mind. First, that it is a maritime region, with some 21 miles of coastline for the 224 square miles of interior, though the coastline is regular and the bordering sea shallow. Secondly, the chief ridge of heights crosses the district from south-west to north-east, and thus lies directly in line with the prevalent south-west winds. The mountains, further, sloping down to south-east and north-west, allow for the southern exposure of one-half of the country, while the other faces northward. Local differences in temperature and rainfall can be clearly correlated with these facts. To deal with the temperature first :—

From records extending over twenty-six years the average temperature for the district is shown as 46° F., a high average for the latitude.

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[1] Continued from p. 29.

The January average is 37° F., July 57° F., the summer reading being particularly high. This is the combined effect of the shallowness of the bordering sea and the presence of high land to the south-west, whereby the south-west winds are deprived of their moisture, and the amount of cloud reduced, giving much sunshine (June monthly average 184 hours).

The highest yearly averages are found at the coast stations. Thus

Dundee records . . . 46·9° F.,
Arbroath ,, . . 47·0° F.,

while Meigle, in the valley of Strathmore, and only 100 feet above Arbroath in elevation, has an average of 42° F. That the difference is due mainly to the higher winter temperature on the coast is borne out by monthly details. Thus:—

	July temp.	Jan. temp.	Range.
Arbroath, one mile from the sea, has	58·3° F.	39·5° F.	20·8° F.
Kettins, 20 miles from the sea, has	57·3° F.	36·1° F.	21·2° F.

If we add the fact that Kettins lies farther south than Arbroath, and that winter temperatures reduced to sea-level show 37·8° F. at Arbroath, but only 36·8° F. at Kettins, the comparison is made more striking.

Records of the lowest winter temperatures emphasise the same fact. During the four winter months the average weekly minimum is—

Arbroath, . . . 11·0° F.
Kettins, ... 0·0° F.

So that at the latter place frosts are of frequent occurrence, all low-lying centres in Strathmore being subject to frosts from November to February, and often experiencing them until the last week of May. At these inland stations January frosts average 17 in the month; May frosts 5; while on the coast 13 frosts occur in January, and those in May are reduced to 2. The relative warmth of winter nights at the maritime stations is traceable to the fact that these lie on a narrow platform of land which slopes down to the sea, so that the night air, as it becomes colder and denser through radiation, slips down to the sea where the cold is counteracted by warmth from the water.

Tables of summer maximums show—

Kettins, ... 80·0° F.
Arbroath, . . . 81·0° F.
Barry, ... 87·0° F.

The last reading is of particular interest as one of the highest recorded in Scotland. The high temperatures experienced in the Barry district show markedly the effect of radiation on the great stretches of level sands which occur there.

Variation in the distribution of rain may be seen from a comparison of the following yearly averages, two series being taken, each including stations lying on a south-west to north-east line, and at approximately the same altitude—

(1) Meigle, . . 30·5 inches
Glamis, . . 30·4 ,,
Forfar, . . 30·3 ,,
Rescobie, . . 28·6 ,,

which are stations from west to east across Strathmore, and—

(2) Murroes, . . 36·6 inches
Craigton, . . 33·4 ,,
Crombie, . . 34·6 ,, (30 ft. higher in altitude),

stations from west to east south of the Sidlaws.

The steady diminution of rain from south-west to north-east is apparent in both series, and arises from the fact that the highlands lie exactly in line with the rain-bearing winds, without transverse ranges to cause irregular precipitation. Rainfall is higher at the southern stations, since the northern are more shadowed by the western Highlands of Scotland. Of the stations north of the Sidlaws those on the slopes of the mountains receive on the average four inches more rain in the year than places in Strathmore.

Monthly averages show important differences, for though wet and dry seasons are less marked here than farther west, there are still effective variations due to the seasonal wind changes.

Average Monthly Rainfall.												Stations.
Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
2·64	1·87	1·65	1·75	1·90	2·28	2·45	2·48	2·50	2·98	2·43	2·46	Arbroath, alt. 61 ft.
3·28	2·29	2·04	1·90	1·96	2·65	3·28	3·21	3·44	3·16	2·42	3·28	Kettins, alt. 218 ft.
3·7	2·83	2·24	2·15	1·85	2·37	2·79	2·94	3·02	3·64	2·96	3·14	Hillhead, alt. 572 ft.
3·7	2·42	2·40	2·13	1·93	2·36	2·81	2·96	3·05	3·65	2·98	3·17	Craigton, alt. 481 ft.
2·7	2·13	1·84	1·94	1·98	2·26	2·48	2·50	3·03	3·24	2·28	2·69	Barry, alt. 35 ft.

An examination of the above tables shows that the minimum fall occurs during March, April, and May, at which time temperature is rising and south-east winds prevail. Wind records at Arbroath give an east wind as prevalent during twenty-eight days in this period, as compared with sixteen days in the previous three months, and this wind coming over Europe brings little moisture. Of the records for these three spring months, that of April is the lowest at most stations, the fall in May being increased owing to the thunderstorms which are frequent then. At Barry and Arbroath, however, the minimum occurs in March.

With the beginning of June rainfall shows an increase, which continues during the summer, and as the south-west winds become stronger and temperature begins to decline in the autumn, reaches its maximum in September or October. During these two months the south-west winds blow, on an average, for thirty-seven days, and rainfall rises to 3·9 inches at Craigton. For inland stations the maximum occurs in September, *e.g.* Kettins, 3·44 inches; for maritime stations in October, *e.g.* 3·64 inches at Hillhead.

After October rain begins to diminish, the records for November, December, and January being approximately equal. In February comes a further decrease as the east winds begin to increase in force.

The chief advantage and disadvantages of these climatic conditions for an agricultural area may be briefly indicated here.

The comparatively high summer temperature allows for the successful cultivation of cereals. Dr. Buchan states that for a good grain growth a temperature of 65° F. must be reached before the end of June. At Arbroath the June temperature rises above this point on fifteen days on an average, at Barry on eighteen days, at Kettins, just to the west of the district, on seventeen days. Thus the condition is amply fulfilled. The summer maximum is also considerably beyond the 70° F. essential for the best crops. Arbroath readings are higher than this for fourteen days, Barry readings for twenty-two days, Kettins readings for eleven days. With regard to summer temperatures, then, conditions are particularly suitable for cereal cultivation.

Average yearly rainfall records vary a good deal at the different stations, but for most of the district lie well within the thirty-two-inch limit. The seasonal distribution of rain, however, is not entirely favourable. The slight precipitation during the spring months allows for the easy preparation of the ground for sowing operations, and the dry weeks from March to May favour oat and barley crops alike. The low rainfall of July also, varying from 2·45 inches to 2·96 inches at different stations, is of great benefit in wheat cultivation. On the other hand, the heavy autumn rains are a great disadvantage, especially in the inland districts where the maximum is reached in September, thus interfering with the final ripening of the grain and with reaping.

VI.—Vegetation.

The main factors controlling the vegetation of the district are those of temperature and soil, rainfall everywhere being sufficient for ordinary crops. Since altitude here ranges from 1493 feet above sea-level to 0 feet above, marked differences of temperature occur, while the numerous varieties of soil found have already been noticed. Consequently very different types of vegetation are represented. The summits of the hills show regions of woodland, heath moors, or hill pastures; the sandy coastal belt is characterised by distinctive maritime plants, while the cultivated lands extend from the coast far up the slopes of the hills.

Owing, however, to the difference in exposure between the northern and southern slopes of the Sidlaws no definite contour lines can well be chosen as boundaries of the respective zones. For example, the ploughed lands which may be found at a height of over 1000 feet on the southern face of the hills, cease on the northern between 700 to 800 feet. Similarly, stretches of gorse occur 990 feet up on one slope, but rarely reach 700 feet on the other. A rough approximation fixes the limits of the various belts 200 feet higher on the southern than on the northern slope, and takes an altitude of 900 feet as the limit of cultivation. Above this lies the belt of woods and moors.

1. *Woodlands.*—The whole of the district was originally very densely wooded, the Royal Forests, as at Kingennie, being long famous. The greater part, however, of the woodland is now farming land, only a small part of the area being forested, with coniferous or deciduous trees.

(a) *Coniferous Forests.*—The coniferous forests are found at various elevations, clothing the slopes of Auchterhouse Hill, 1300 feet above sea-level, but flourishing also on the sandy coastal plains at Barry. The largest continuous area stretches across the central Sidlaws.

These forests are composed mainly of larch, Scotch pine, and spruce trees. The larch woods are on the basalt heights of the west, the close forests preventing the development of any undergrowth; Scotch pine trees flourish in the peat and heather districts of the hills, in the lateral valleys, where slopes are too steep for cultivation, and at intervals along the coast.

(b) *Deciduous Forests.*—In some of the sheltered valleys of the uplands deciduous woods replace the conifers, as in the valley of Glamis Burn, and nearly all the woodlands in the cultivated area are of this nature. These are mainly artificial plantations—of oak, beech, elm, and ash, oak and beech largely predominating. The area of oak woods is, however, being reduced, and that of mixed deciduous woods extending.

2. *Moorlands.*—Although in parts plantation of conifers may reach the summits of the Sidlaws, most of the highest ground is moorland, either grassy or covered with heather and kindred plants.

(a) *Heather.*—The heather moors lie mainly to the west of the range, Auchterhouse and Craigowl showing great tracts of heather between the woods. Here the basalt of the heights forms a poor soil, suitable only for such growth, which is typical of the region, contrasting with the grassy covering of andesitic hills in the near neighbourhood.

Heather stretches also occur across the centre of the range (Gallow Hill) and in the peaty districts of the east, mixing with bracken and whin. Bracken is seen most in the clearings of the coniferous forests of the hills, especially on the broken southern slopes; whin covers a large area south of Balluderon Hill, and is found with heather in the loose peaty soil of many of the upper knolls of the southern Sidlaws.

3. *Grass-lands.*—A distinction has already been made between the poor soil of the northern hill-slopes and the lighter, richer soil of the southern. This distinction is shown clearly in the pasture conditions.

In the south the broken escarpments of the crumbling volcanic rock allow for the collection of loose soil in the depressions. These are largely arable, but where uncultivated are covered with rich pasture, while the intervening mounds may be dry and rocky, or gorse-covered.

Above the limited cultivated zone the northern slopes form but a poor pasture area. In the east small peat-bogs lie, allowing for the growth of much sphagnum or bog-moss. In these peaty areas stunted heather may grow, but the development of this is retarded by the grazing.

The following table shows the four parishes of the Sidlaw group which have the greatest extent of mountain and grass-land used for grazing:—

Parish.	Grazing Land in Acres.	Percentage of Total Parish Area.
Auchterhouse, . .	1889·5	30 per cent.
Glamis, . . .	4018	28 ,,
Newtyle, . . .	1221	23 ,,
Tealing, . . .	1152	16 ,,

The position of all these parishes at the extreme west of the range emphasises the fact that the eastern Sidlaws represent, on the whole, a cultivated area, a consideration of which will fall under the discussion of agriculture in the section on economic conditions.

4. In the *Maritime Belt* vegetation varies from the marsh plants in the hollows where water collects, to the dry grasses of the sandy ridges. The shifting dunes near the sea-edge frequently show a slight growth of sea-couch grass, forming small scattered patches. The long underground stem of this aids in binding the dune together. As it becomes more fixed, larger patches of sand-bent or lyme-grass are found, while in the sheltered hollows, are mosses or dry grasses, according to the drainage conditions. Where the dunes are permanently fixed, the grass covering is more or less continuous, small stretches of heather occurring in parts.

VII.—Economic Conditions.[1]

In economic conditions, as in physical features, the region is one of great variety. It includes at once districts where highly specialised manufacturing industries have developed, and where the effects of the concentration of trade in a great industrial centre are seen; districts furnishing rich agricultural land; and yet other districts where farming conditions are harder or the land is purely pastoral. Thus great diversities exist.

Agriculture.—The climatic advantages of the region from the point of view of agriculture, and the general richness of the soil due to the presence of decomposed volcanic rock, have already been described. When to this is added the advanced stage of farming reached in the district, it is natural to find it ranking as an important agricultural area. With the increased demand for agricultural produce consequent on the growth of industrial centres, more and more of the land has become arable, large areas having become reclaimed during the last half-century.

Draining operations in Strathmore and the eastern Sidlaws have done much to increase the acreage of cultivable land, raising the percentage of such in the district to above fifty.

The agriculture carried on is mainly "mixed farming," but crop-growing is relatively more important than cattle and sheep rearing.

The returns for the following parishes, which have been selected as typical of different areas, show the acreage under the most important crops in 1913:—

[1] The statements and figures refer to the period before the war.

ACREAGE UNDER CROPS:

Parish.	Position.	Oats.	Barley.	Wheat.	Turnips	[illegible]	[illegible]
Arbroath,	South-east.	1813	1372	754	1457	1076	5053
Strathmartine,	South-west.	1078	512	340	726	677	1275
Carmyllie,	East Sidlaws.	1477	793	55	913	333	2228
Tealing,	West Sidlaws,	990	471	115	636	267	1695
Eassie-Nevay,	Strathmore,	686	338	203	437	359	1286

There are several points to be noticed in connection with the table.

Wheat.—First, the small proportion of wheat as compared with other cereals, but its relative importance in some parishes.

The vegetation map shows that over a fairly large area (4990 acres) wheat enters into the usual crop rotations. The wheat-growing land lies in two belts across the country, one south of the Sidlaws, the other in Strathmore. These belts coincide roughly with that showing an average yearly temperature of 46° to 48° F., with a summer average of 56° F., and rainfall of 32 inches. From a consideration of the crop rotations as collected from a number of farms throughout the district, it would appear that the southern zone of wheat cultivation extends across the coastal belt and up the slopes of the Sidlaws to a height of about 500 feet, while on the northern side cultivation ceases at 400 feet. The differences between the slopes as regards climatic conditions and soil have been referred to previously.

The best districts lie along the southern exposure of the Sidlaws and near the coast, the greater value of these districts lying in the higher summer temperature registered there; this rises above 70° F. in the summer months, a reading which is essential for the best grain crops.

In these parishes the wheat is sown in the "sixes" rotation, *i.e.* two years' grass, two years' green crops, two years' grain, the greatest yield being returned for winter wheat sown after potatoes. This yield averages 34 bushels, as compared with 31·7 bushels, the average for Great Britain.

Winter wheat is also sown at an elevation above that of the regular wheat zone, the object being to lessen farming operations in the spring. Here, however, owing mainly to the heavier rainfall, the yield is small and of little value. Throughout the whole upper region only forty acres were sown with spring wheat in 1913.

In spite, however, of the satisfactory return from some parishes, the total acreage under wheat in the area is steadily diminishing, with the increased cultivation of oats and barley. Thus returns for the country show:—

1881.	1891.	1901.	1911.
40	33	28	19 acres of wheat per 1000 acres.

Oats and Barley.—The importance of these two crops is at once apparent from the table. In 1913 the total acreage in the district

under oats equalled 20,004 acres, while that under barley equalled 11,936 acres, the crops together covering a quarter of the whole area.

The growing of oats is common to the whole region, farms with a rotation of oats, turnips, and grass being found on the summits of the eastern Sidlaws, while a "fives" rotation which includes two grass crops, oats, potatoes or turnips, and barley, is usual to a height of 900 feet. Even in the southern parishes, where wheat is important, the acreage under oats and barley is from four to six times that under wheat.

Root Crops and Rotation Grasses.—Acres under:—

	Potatoes.	Turnips.	Rotation.	Pasture.
Parishes south of Sidlaws, .	4951	6200	4769	8069
„ north „ . .	3011	7945	4781	16,198

The preceding summary indicates the relative importance of these crops in the southern and northern parishes. In both districts they are important, the area under potatoes and turnips being unusually great. The former are more grown in the southern parishes, especially those of the south-east, where much work is done in preparing the crops for the early market, an average of 100,000 tons of early potatoes being shipped from the port of Dundee each year.

The extensive cultivation of turnips in the northern parishes is due to the demand for these for sheep-feeding there, while the general cultivation bears witness to the predominance of "dairying" in the district.

Dairy-farming is of particular importance in connection with the Dundee market, and the demand for dairy produce there regulates the cropping of all the land near the city.

It is in Strathmore, however, that the "Angus cattle," for which the country is famous, are bred, these polled cattle, or "Angus Doddies," having been introduced from Norway more than 200 years ago. Glamis ranks first of the Strathmore parishes in this connection, having 1722 head of cattle in 1913. Many of these are fattened for the Smithfield market.

Reference has already been made to the extent of grazing land in the various parishes. Sheep-rearing is of chief importance in the north-west district, and Glamis with 5218 sheep, Newtyle with 2867 sheep, represent the foremost parishes, each having approximately two sheep per acre. The chief breed here is that of the black-faced sheep of Peebles-shire.

Fishing.—Fishing has developed at five stations along the coast—Dundee, Broughty Ferry, Arbroath, and the little villages of East and West Haven. The main fishing grounds for the Dundee centre lie between sixty and seventy miles off the coast, and in the Tay estuary; for the Arbroath centre between one and seventy miles off shore. From these stations fish (herring, haddock, cod, shell-fish) to the value of £43,000 were caught during 1913, a slight decrease in value from the preceding years. Of this catch more than three-quarters was returned at Dundee; Arbroath, which ranked second, bringing in just under one-fifth of the total. This

irregular proportion arises from the fact that trawling is operated almost entirely from the former centre, nine steam drifters working from the Dundee port during the year. The principal grounds for these trawlers lie to the south-east and north-east of the Bell Rock, within a radius of about seventy miles.

In this district, as wherever trawlers have been introduced, the tendency has been for the smaller fishings to become consolidated into one continuous fishing. It must be noticed now, however, that the rate of increase in the number of trawlers already begins to show signs of lessening, and in this particular district the custom is for several fishermen to unite in ownership of a small motor boat, the average earnings of which approximate to one-third of those of the larger trawlers. The Report of the Commission on North Sea Fishing (1914) advocates State grants for this purpose. The importance of the development of the small motor boats, "haddock yawls," is brought out by realisation of the fact that trawling is necessarily confined to ports with a sufficient depth of water to admit trawlers at all states of the tide. Dundee is one of the few ports on the east coast of Britain where such a condition is fulfilled, so that the industry should develop there, especially as it is calculated that there is room for an additional fleet of forty to fifty trawlers on the grounds south of Bell Rock during the June to August fishings.

No fewer than seventy boats work from the Arbroath creek, one of the few centres that continue line-fishing. Yet the calling is being gradually deserted, and the number of resident fishermen steadily decreases. The same decline is noticeable in the line-fishing from Broughty Ferry, though here the supplementary "take" of shell-fish keeps up the returns, while at West and East Haven crab- and lobster-fishing is the only form of the industry. Nearly all the return to these three ports is sent to the English market (Billingsgate).

The market for herring, on the other hand, is mainly continental, and the Scotch industry is beginning to feel the effect of the development of the various "curing" trades on the Continent. The State assistance given in other countries sharing the North Sea fishing makes competition unequal, and therefore it is suggested that in Britain also grants should be made to enable fishermen to provide themselves with modern fishing vessels.

While Dundee still represents the headquarters in the country of the whale- and seal-fishing, the industry is now comparatively unimportant. Its decline is due to the increasing use of mineral oils, and the greater difficulties of whale capture on the original fishing grounds, while the continuance of the industry depends on the jute trade, the chief demand for whale oil being in connection with the steeping of the jute fibre in such oils.

In place of the former twelve whalers, Dundee now possesses eight only, and of these three are but small boats.

Urban Industries: Manufactures.—In dealing with the industries of the centres of population the textile manufactures stand out pre-eminent. A consideration of these becomes, in reality, one of the jute trade, and

consequently of the city of Dundee, since the leading industry is centralised there to an unusual degree. The phenomenal development of the trade is a matter of common knowledge, as is its rapid growth until 1883, during which time Dundee held a practical monopoly of the trade, and the subsequent fluctuation due to the rise of foreign competition. This competition arose mainly from the introduction of jute spinning and weaving in Calcutta, where expansion has been even more rapid than in Dundee itself. Thus in 1881 Calcutta used 890,000 bales of raw material, in 1909 no less than 4,274,200 bales. Together with the increase in the consumption of raw material in India has come a decrease in the acreage under cultivation, that falling from 3,000,000 acres in 1905 to 2½ millions at the present time, and, consequent on the rise in price, a stoppage of machinery and reduction in the hours of labour in Dundee and Calcutta alike. The depression in Dundee increased during 1913-14, and attempts were then being made to secure extension of the area under cultivation. The drawbacks under which the city labours with regard to the Indian competition are due both to the greater command of raw material in India, and the cheaper labour to be obtained there. It is calculated that Hessians can be produced in Calcutta at forty to fifty rupees per ton more cheaply than in Dundee —a fact of great import, since the manufacture of Hessians of wide width is one of the chief branches of the Dundee trade. A great development has recently taken place, however, in the spinning of yarns as cord and rope, while much of the jute is still exported in the form of jute yarn, prepared in rolls and chains so that it is ready for the loom.

The raw material used in these various branches of manufacture represents an average value of £4,000,000 yearly, while the mills of the city employ 34,000 hands. The extent to which the industry is localised is shown by the fact that of the 228,545 tons of jute imported during 1913-14, 96·4 per cent. was used in the city itself, the small remainder being sent inland to Forfar and other minor centres.

The linen manufactures, on the other hand, are much more generalised, and in 1913 nearly 45 per cent. of the incoming raw material was distributed from Dundee. The total flax import was approximately one-quarter of that of jute, the amount maintaining the very slight increase that has prevailed during recent years, in contrast to the steady decrease previously registered. This decrease arose from the development of the jute trade and the lessening demand for sailcloths. The decline was particularly disastrous to Arbroath, where canvas manufacture was important, though the same slight revival prevailed there just before the war. The trade then consisted almost entirely in the manufacture of coarse linen, canvas, and duck for Government purposes.

Outside the Dundee area linen weaving is centred mainly at Arbroath, Forfar, and Carnoustie, and in these districts the bleachfields are conspicuous along all the river valleys.

Until the end of the last century flax was grown locally, there being

119 acres in the district in 1887.
2 acres in the district in 1892.

The former extent of the rural industries is indicated by the number of disused mills to be seen in all parts.

Hemp also was originally grown on the farms in the neighbourhood, being used in the manufacture of fishing-nets or hemp cordage. The present imports show the same tendency to revive as those of flax, as the following figures indicate:—

1910 import = 2657 tons.
1913 import = 3072 tons.

Of this latter amount 25 per cent. only was distributed inland, all the remainder being worked up in the Dundee factories.

Subsidiary to the textile manufactures are the engineering trades of the district, developed at Dundee, Arbroath, and Monifieth. At these centres the manufacture of machinery for various weaving operations is carried on, the industry specialising in machinery used in the jute works. This trade has arisen both to supply the local demand, and in connection with the profitable market for such goods in Calcutta, Japan, and China, to which countries most of the exported machines are sent.

In Dundee shipbuilding ranks third in the number of hands employed (2100 in 1913). The possibilities for the further development of this trade seem great, since harbour improvements have ensured sufficient depth of water for the floating of large vessels, and the absence of mineral wealth in the hinterland is compensated for by the nearness of the Fifeshire field. Further, the harbour is backed by a large extent of vacant land recently reclaimed from the waters of the estuary, allowing some 140 to 150 acres for the extension of the shipbuilding works.

In this harbour lies one of the chief assets of Dundee. It opens out into the Tay at a distance of ten miles from the North Sea, and is protected from the north-east and south-east gales by the Gaa and Abertay sandbanks, which form a natural breakwater. The enlargement of the docks and wharves at various periods have resulted in their extension over an area of 38½ acres, but schemes for further expansion are being considered. Such extension is made necessary by the increase in size of the vessels bringing jute from Calcutta, some of these carrying between 800 to 1000 tons of jute. The vessels number about fifty, and since the import is now confined to five months of the year, congestion in the harbour sometimes takes place.

The extent of the harbour trade is indicated by the average of nearly 4000 vessels entering during the year, the trade being thus distributed:—

Coastwise vessels = 50 per cent.
River trade = 37 per cent.
Foreign vessels = 13 per cent.

The four closed docks are used for the coasting and continental traffic, the East Indian vessels entering deep-water wharves farther east, while a special dock has been provided in connection with the trawling industry.

The Site of Dundee.—The harbour, which is thus one of the main factors allowing for the great extension of the city, appears also to have been the original cause of a settlement here. That such settlement dates back to prehistoric times has been evidenced by the discovery during excavations in Dundee of a "kitchen midden," showing that a colony of fishermen occupied the shore at this point. Subsequent Celtic settlements were governed by the fact that the Law Hill, rising directly behind the city to a height of 573 feet, presented easy opportunities for coast defence, while the convergence on this point of the coast of the two chief routes across the western Sidlaws, *via* Coupar-Angus and Newtyle, must always have been a powerful factor in determining the site of the city of Dundee. As population increased, the fact that the fertile Carse of Gowrie lies contiguous to the port, while the hinterland provides a rich agricultural area, further aided development.

In enumerating the advantages of the site of Dundee mention must also be made of the fact that in easy communication across the estuary of the Tay lie the industrial centres of South Fifeshire.

Minor Industries.—It is impossible to deal here with the many minor industries of the district, prominent among which may be mentioned the wooden and paper manufactures of Dundee, and the various branches of the leather trade in Arbroath.

Quarrying.—The sandstones of Forfarshire form unusually good building and paving stones, and are extensively quarried. Though the output is only half that of Dumfries, and does not equal that of Fifeshire, the value is relatively much greater, averaging £20,000 yearly. The output, however, shows a steady decrease, since the recent development of concrete has seriously affected the trade, and many quarries are now worked only at long intervals, while some are entirely disused.

Thus, the Wellbank Quarries, famous for their stone as long ago as 1574, employ now eighty men only, in comparison with the hundreds of some years back. This fact is the more significant inasmuch as the quarries being comparatively near the market of Dundee have felt the depression of trade less acutely than others more remote.

The largest quarries occur in the Carmyllie district of the eastern Sidlaws. Here the oldest beds of the sandstone series are reached, and the grey sandstone, close-grained and tough, forms a much less brittle building material than the higher beds. The quality of the stone, however, differs in various quarries, since the strata are separated by beds of indurated clay (caumstone) which vary in thickness from a few inches to several feet. Some layers form at best rough rubble for masonry, others are good.

The stone was originally used for a variety of purposes, as for roofing materials—many examples of old cottages roofed with thin slabs of stone occurring in the district—or for oven-soles in Dundee, since the close stone is almost fireproof. The main use, however, has always been for paving-stones, and the "Arbroath pavements" are famous. Those prepared in the district were originally shipped to great distances. In 1654 they were being sent to London, Holland, and North America,

where they were used as millstones. Now the stones are sent chiefly to Dundee by means of the light branch railway to the Dundee-Arbroath line.

Ranking after the Carmyllie Quarries are those of Pitarlie and Wellbank. All the quarries in present use lie relatively near to Dundee or Arbroath, but earlier ones were worked north of the Sidlaws, as at Glamis, the heavy stone being sent by pack-horse across the hills. A 1684 account mentions the regular carriage of slates and freestones on horseback from Glamis to Dundee.

In some parts of the district the volcanic rock is quarried for road metal, but its use as such is not extensive, as the trap is crumbling and weathers rapidly on exposure.

VIII.—Communications.

The principal lines of movement across Southern Forfarshire have always been along two south-west to north-east lines, one following the coast, the other the fertile valley of Strathmore.

The coastal route led along the level of the 100 feet terrace to the Abbey of Arbroath; that in Strathmore, keeping close to the base of the Sidlaws in order to avoid the marshes of the valley bottom, was directed towards the Isla and Tay valleys, and so to Central Scotland

Three transverse lines connected these longitudinal routes, the Sidlaws presenting a serious obstacle to all such roads. The western road crossed the mountains by means of the transverse valley of the Newtyle Glack, a route originally strongly fortified as the main line of communication between eastern Strathmore and the Tay estuary. A second transverse route skirted the eastern end of the hills, leading towards Brechin, an ecclesiastical centre before the tenth century, while a third main road led due north from Dundee to Forfar, where William the Lion held his parliaments.

These five routes represent the early lines of communication. No Roman road is to be traced in the district, the main Roman route to Central Scotland cutting across the north-west corner from Cardean towards Kirriemuir. It is supposed, however, that a branch road led from this route south eastwards through Forfar to the coast, affording the Romans connection with their ships. The modern roads perpetuate the old routes. They may be grouped as converging on the four corners of the quadrangle which the district forms—that is, on Dundee, Arbroath, Forfar, and Newtyle.

From Dundee roads radiate to the west, north, and east. The most important is the coastal route passing through Dundee. This links up Perth and the routes from the south and west which converge on that town with Dundee, Arbroath, and Aberdeen.

A direct line of communication between Dundee and the north is afforded by the Forfar road, leading through the county town to Brechin and eastern Strathmore, though the gradient of the road is necessarily steep. No main road crosses the Sidlaws between this route, with its branch to Glamis Castle, and that through the Newtyle Glack, consequently all road traffic is concentrated on one or other of these.

Two parallel routes cross the eastern Sidlaws leading from Dundee to Montrose. The western of these leads through the moors of Kirkbuddo, and on old maps is shown marking an enormous detour on account of the Dilto Moss, now drained. This is the "King's Way," which connected the castle of Malcolm II. at Forfar with the coast. The other road crosses the stone-quarrying district of Carmyllie.

Railways.—The railways emphasise the direction of the old roads, the lines being continuous round the outskirts of the area, and one branch of the Caledonian system cutting from south to north across it (Fig. 1, p. 19).

The coastal line is part of the main east-coast route from England into Scotland, crossing the Tay estuary by the viaduct, and continuing through Dundee to Arbroath, Aberdeen, and the North. Within the district it forms a joint line of the North British and Caledonian systems. It is laid quite close to the coast, with which it is parallel, save where it cuts across the Buddon promontory. From Eliot junction a light branch railway serves the quarries of the Carmyllie district.

The Strathmore route is followed by the chief line of the Caledonian system from Perth to Aberdeen. This line enters the district 1½ miles north-west of Glamis, where it bridges the Dean Water. Thence it strikes directly south-westward to Perth, keeping, like the main road, well away from the low valley-bottom. A branch line is thrown off to Friockheim, and continues, skirting the eastern boundary of the district, along the Brothock valley to Arbroath. A north-to-south branch connects these two main routes, but this is a circuitous line, making a great turn to the east to avoid the Gallow Hills.

The line of most interest historically is that from Dundee to Newtyle, the modern line representing one of the pioneer railways of Scotland. This early line, completed in 1826, ran north-westward from Dundee, sheer over the summit of Hatton Hill (870 feet), the train being raised or lowered at three steep inclines by wire ropes, while in the more level tracks horses were employed to haul it along. The modern line crosses the Sidlaws just to the west of the old route, using the transverse valley of Newtyle, and connecting with the Strathmore railway.

IX.—Population.

When it is recognised that the south of Forfarshire includes parishes which vary in density of population from Inverarity with 78 people to 1000 acres, to Dundee with 30,658 to 1000 acres, it is obvious that a calculation of the average population for the whole area is of little value. The component parts differ so widely *inter se* that an average thus found would not give a true representation of any part of the area. Consequently the area may be at once divided into the rural and urban districts, a comparison of which will bring out the main characteristics of the distribution of population.

The greater part of the present population lies in a broken belt along the coast, the belt being fairly continuous west of Buddon Ness, but the

population being grouped at either end of the eastern half, while the intervening strip is but thinly peopled. Behind the coastal strip the distribution is fairly equal, the grouping showing a tendency to follow west-to-east lines, and becoming thinner towards the base of the Sidlaws. In the hills the western heights are almost without population, while the eastern have lines of settlement following the two transverse routes.

Through the valley of Strathmore settlements are at the foot of the hills, where the largest centres of Glamis and Newtyle lie, at the points of convergence of transverse and longitudinal routes. The dependence of the development of Newtyle on the facility for communication is made apparent by noting the changes in the population, an increase coinciding in date with the opening of the railway in 1830.

In the rural districts of the north-west depopulation is everywhere apparent. Whether the parish lies high in the Sidlaws or down in the valley of Strathmore the same fact holds good. Sixteen per cent. only of the total population is found in the country districts, the figures showing a decrease of 3·9 per cent. between 1901-11. As in other parts of the country, this fall can be traced to the decay of rural industries incident on the increased centralisation of trade, and the consequent movement of people towards the large towns. The concentration of the linen trade in Dundee has brought about the decay of the characteristic industry of the country, and villages like Charleston show a line of deserted cottages. Restriction of quarrying to districts near large towns has been effective in the same direction.

In the eastern Sidlaws two fairly distinct lines of settlement continue along the south-west to north-east routes, the more marked being that of the eastern line. These represent a farming population, and since the farms lie away from the road the district appears less densely populated than is really the case.

Country districts south of the Sidlaws do not show depopulation to nearly so great a degree, the greater agricultural value of the land, and the nearness to large markets, tending to keep a comparatively dense agricultural population.

The district around Dundee has shared in the increase of this centre, the town dominating the whole south-eastern area. It has grown steadily for half-a-century, so that while originally it lay in the shelter of the Law, it now extends almost completely around it. Its rise is correlated with the development of the jute industry.

On the 1911 census 58·6 per cent. of the population is within the city itself, showing an increase of 1·2 per cent. on the previous record. The proportion of men and women in the city is important. Out of a total of 165,000, 91,000 are women, 74,000 are men. This fact is to be connected with the staple trade of the town, since the jute industry depends chiefly on female labour, more than two-thirds of the jute workers being women. The proportion of female labour in the city was even greater at earlier censuses, the recent rise in the number of men workers being due, possibly, to the extension of the engineering trades of the district. In spite of this extension, a steady tide of

emigration proceeds from the city. On an average no fewer than 2000 men and boys emigrate annually, 45 per cent. of whom go to Canada, 30 per cent. to Australia.

With the increase of the city has come the increase in the surrounding burghs of Broughty Ferry, Carnoustie, and Monifieth. Monifieth shows a gain of 12·6 per cent. on the previous census, while Broughty Ferry, a few centuries ago but a line of fishermen's huts, has become the third town in Forfarshire, forming a residential suburb of Dundee. On the other hand, population is decreasing in Arbroath, Forfar, and Carmyllie.

Summary.

Some of the points of comparison between the different natural divisions of the region have been indicated in the preceding pages, but their general characteristics may be very briefly summed up here.

Strathmore is a synclinal trough, profoundly modified by ice action, and covered with thick deposits of boulder clay and fluvio-glacial gravels. The western end shows also a covering of recent alluvium. Since the glacial epoch the region has passed through at least three cycles of erosion, the approach to a mature stage reached by the second and third being indicated by the width of the valleys and graded slopes of these stages. Owing to soil and climate conditions, and partly also to the intermediate position of the district between two relatively infertile areas, Strathmore is an important agricultural region. Its position makes it also a main line of communication between the north-east coast and the lower valley of the Tay.

The Sidlaw Hills consist of an anticlinal ridge of volcanic rock, rising to a height of 1492 feet in the west, but averaging 500 to 600 feet only in the east. The hills are long and smooth-backed owing to ice action, and are partly clay-covered. Where the volcanic rock is exposed it weathers into irregular peaks. The north-western escarpment forms a forested or heather-covered district, while the eastern hills and most of the terraces of the southern slopes are cultivated. Lines of settlement follow the two eastern routes across the hills.

The northern part of the coastal plain, sloping gently to the south, and intersected by numerous small streams, shows extensive glacial deposits, the east-to-west trend of which controls the direction of the main river. It is a rich agricultural region, the boulder clay, mixed with decomposed volcanic rock, forming a peculiarly fertile soil. Agricultural development in this district is governed by its contiguity to the industrial centres on the coast, and dairy-farming and intensive fruit cultivation replace the more mixed farming of Strathmore.

Along the coast beaches indicating former sea-levels can be traced distinctly. On the lowest of these rest recent deposits of sand, forming the great dunes of Buddon Ness. These show every stage from the sandy ridge of the incipient dune to dunes permanently fixed and grass covered.

These three divisions constitute Southern Forfarshire, a district of

great diversity in physical features and economic conditions, but of much of which the old chronicler's account, written in 1682, is still true: "ane extraordinaire pleasant and sweet place."

The following articles or books have some reference to Southern Forfarshire.

Physical—P. Macnair.—*Geology and Scenery of the Grampians and Strathmore*, vol. ii., 1908.

Sir A. Geikie.—*Ancient Volcanoes of Great Britain*, vol. ii., 1897.

Vegetation—R. and W. G. Smith.—"Botanical Survey of Fife and Forfarshire," *Scottish Geographical Magazine*, xxi.

Economic—"Returns of Scottish Board of Agriculture."

"Report of Commission on North Sea Fishing, 1914."

"Census Reports."

Angus or Forfarshire (Warden) gives a fairly full account of the history of the country, while interesting old maps are those of Edward, 1678; Adair, 1703 (map of the Tay Basin); Knox, 1831.

GEOGRAPHICAL NOTES.

Asia.

Water-power and Rainfall in India.—An article in *Nature* gives an interesting account of the establishment of hydro-electric works to supply Bombay with water-power, based on the heavy rainfall of the Western Ghats, to replace steam-power in the mills and factories. The industries of the town have hitherto suffered from the distance from which coal has to be brought (about 1200 miles), and the poor quality of Indian coal. Behind the town, however, only some forty miles distant, rises the precipitous edge of the Western Ghats, with a height of about 2000 feet. The heavy but variable monsoon rainfall is limited to three or four months of the year, and during the remaining months the watercourses are dry. Thus it is necessary to store water for the dry period. This has been done by the building of four masonry dams, which form three lakes, containing sufficient water to maintain the power through the dry season. The works are constructed to supply power to the amount of more than 100,000 horse-power throughout the year. The water after use is also available for irrigation, and the power is cheaper than that supplied by coal, oil, or spirit from vegetable products. It is hoped that similar schemes may be carried out in other parts of India, and thus enable the country to work up its own raw material, and so to compete with America or Japan in the production of manufactured goods. As the article notes, Indian labour is "cheap and docile."

In connection with the establishment of the power works, special rain gauges have been established, both on the hilltops and in the plains during the last eleven years, and have yielded some remarkable results. During this period one gauge at a hill station gave the

very remarkable total of 546 inches, which fell in a little more than three months, 460 inches falling in about two months. In view of the shortness of the period of fall, this may be said to be the heaviest rainfall yet measured, for though it has been equalled two or three times during the last fifty years at Cherrapunji, there precipitation occurs during seven months of the year. The lowest annual fall during the last forty-eight years in the Western Ghats was one of 82 inches at the margin of the Deccan Plain, so that there is obviously great variation, and this has had to be allowed for in the establishment of the storage system.

Polar.

Rasmussen's Greenland Expedition.—In this *Magazine*, vol. xxxiii. pp. 199 and 251, we gave an account of Mr. Knud Rasmussen's plans for his last expedition to Greenland. The explorer returned to civilisation last year, and the work of his expedition is noted briefly in the *Geographical Journal*, vol. lii. p. 65, and vol. liii. p. 59, as well as in *La Géographie*, xxxii. p. 195. Some excellent work was done, under conditions of great hardship, which resulted in the death of Dr. Thorild Wulff, the botanist of the expedition, and of the Eskimo Henrik Olsen. The following account can be followed by the help of the map accompanying Commander Peary's article in vol. xix. p. 617.

The 1916 season was devoted to the exploration of Melville Bay, which was surveyed along a distance of 300 miles. On April 6, 1917, Mr. Rasmussen, accompanied by Dr. Wulff and Mr. Koch, the geologist and surveyor of the expedition, with numerous Eskimos and dogs, left the headquarters of the expedition at Thule, on Wolstenholme Sound, for the northern journey. The north-west and then the north coast was followed as far as a point on De Long Fiord, and the months of May, June, and July were devoted to the exploration and mapping of the great fiords from Sherard Osborn to De Long Fiord. Here a number of modifications were made in the existing maps. Thus Nordenskiöld Inlet, assumed to be the mouth of the apocryphal Peary Channel, was found to end in a glacier only 12 miles distant from the sea. Further, no channel starts from Sherard Osborn Fiord in the direction of the supposed Peary Channel, but a large new fiord, north of Nordenskiöld Inlet, was found to run into Peary Land for a distance of about 30 miles. The expedition suffered greatly from lack of food, as game, on which the party had meant to depend, proved extremely scarce. Towards the end of July the Eskimo Olsen disappeared during a hunting expedition, and the party was delayed by an unavailing search for him. On August 5 the return was begun, and at St. George Fiord an ascent was made from the coast to the inland ice, in order to shorten the homeward journey. The difficulties were very great, and when the sea was again reached at Cape Agassiz, 140 miles north of Etah, on August 24, food supplies were exhausted, the last dogs having been eaten. Mr. Rasmussen and one Eskimo started on foot for Etah, and despatched food and sledges to the remainder of the party, but Dr.

Wulff had succumbed before help arrived. The winter of 1917-18 was spent at Etah, whence Messrs. Rasmussen and Koch returned to Europe.

Large geological and botanical collections were made, the latter including a number of specimens not previously recorded from the north coast. The geological observations made are also important, while a negative point of interest is the leader's conclusion that Eskimo have never travelled from the west to the east of Greenland by the north coast.

General.

New Type of Weather Charts.—With the passing away of war conditions, the daily weather chart has reappeared in the *Times*. The form is, however, novel, for the new unit of the bar is employed in place of inches of mercury in the drawing of the isobars. The bar, it will be recollected, is equal to an air pressure of 750·1 mm., or 29·531 in., and on the daily chart the isobars are drawn at intervals of 5 millibars, a millibar being the thousandth part of a bar, equivalent to ·03 in. On the chart the isobars are, however, also labelled with the equivalent of the millibars in inches of mercury. Since the interval is 5 millibars, the difference between one isobar and the next is ·15 in., as contrasted with ·10 inch on the pre-war maps.

"Le Mouvement Géographique."—We are glad to welcome once again this Belgian journal, which ceased to appear during the war period in consequence of the German invasion, and, after an interval of nearly four and a half years, began a new volume at the beginning of the present year. The first number of the new volume records the death at Brussels, on March 25, 1916, of the chief editor, M. A. J. Wauters, the founder of the journal. It contains also an interesting article, illustrated by a sketch-map, on the question of the enclave of Maestricht in its relation to the problem of adequate canal communication between Liége and Antwerp, as well as a number of notes on events in Belgium and the Belgian Congo during the years of silence.

Commercial Geography.

Switzerland's Access to the Sea.—One of the consequences of the war has been to bring into prominence the need for adequate connections between Switzerland and the sea. Plans have been already brought forward for improving the connections with the Mediterranean, but so far as transatlantic commerce is concerned, the west coast ports of France offer advantages as compared with Marseilles or Genoa. Only two French ports present themselves as possibilities in this connection —Nantes and Bordeaux. But in the case of the latter the intervention of the highest part of the Central Plateau of France between the coast and Switzerland offers a great obstacle, for the existing cross-lines have such steep gradients that heavy merchandise could not be carried at a

profit. The utilisation of Bordeaux as a "Swiss" port would therefore involve the construction of an entirely new trunk line. Nantes and St. Nazaire are more favourably situated, and in this case the existing lines could be used without modification. At a Congress held at Nantes in July last, M Jean Sigg, a Swiss deputy, read a paper on the subject, which is summarised in *Annales de Géographie* for November 15, 1918. M. Sigg proposed that a free port for goods to be imported into Switzerland should be established at Nantes. The latter is an important railway centre, and is closely connected with the out-port of St. Nazaire. From Nantes a transverse railway route runs by Tours to Nevers, where it connects with the P.L.M. system. By Le Creusot and Chagny there is a direct connection with Dijon, and it would be possible to run direct through trains from Nantes to Pontarlier, to Bâle, to Belfort, and Mulhouse, and so tap, not only the Swiss trade, but also that of Upper Alsace, Franche-Comté, and even of Italy, Austria, and the East by means of the various Alpine tunnels. Not only has this route easy gradients, but it passes through productive regions, notably the rich agricultural area of the Loire valley, and the industrial belt of Central France.

EDUCATIONAL.

Gilchrist Educational Trust: Studentship in Geography.—The Gilchrist Trustees are offering another studentship in geography this year. The value will be £80, and the studentship is tenable at any recognised school of Geography. Application should be made to Professor L. W. Lyde, University College, Gower Street, London, W.C., before March 1st.

NEW BOOKS.

EUROPE.

Les États Chrétiens des Balkans depuis 1815. *Roumanie, Bulgarie, Serbie, Monténégro, Grèce.* Par Louis André. Paris: Felix Alcan, 1918. *Prix* 3 *fr.* 50 *c.*

This book forms a part of a library of contemporary history, and is devoted to the internal political history of the States named in the title, during the hundred years prior to the outbreak of the war. The events which have occurred since the beginning of the war are practically not considered, and little is said of external affairs, for, as the author justly observes, these have been discussed by others in not a little detail, while the less generally interesting subject of internal political development has been much neglected. It is, indeed, for the most part, a somewhat sordid story of intrigue, plot, and counterplot which Dr. André has to tell, and he says little of the brighter side of recent Balkan history.

It is impossible to summarise here political events in the different States during the period under consideration, and we shall confine ourselves almost entirely to the author's conclusions, remarking merely that his careful and systematic analysis

of events and trends of policy throws much light upon the recent history of the peninsula, and that his book thus forms a very useful supplement to the other historical books devoted to it which have appeared in recent years.

In his final chapter the author arrives at the somewhat pessimistic conclusion that a study of the internal politics of any of the five States tends to deprive the student of whatever sympathy has been previously aroused by accounts of individual or national acts of heroism on the part of these States and their members. To all of them, save, with certain qualifications, to Rumania, he would deny the title of modern State. The first cause of this he finds in the fact that these peasant peoples passed without any preliminary period of preparation from cruel oppression to absolute freedom, and, to his mind, they do not possess either the political skill or even the necessary education to guide them aright in their use of this freedom. With the exception of Pashitch in Serbia and Venizelos in Greece, he considers that no statesmen in the strict sense have yet appeared in the Balkans, and all the States have been a prey to interested politicians of the worst sort. Of the Greeks he says:—"For them, since the beginning, political life has had no *raison d'être* save in so far as it affords a livelihood to those who take part therein," and he implies that the Greeks are not singular in this respect, if conditions are somewhat worse within their country than elsewhere. Secondly, he lays stress on the chauvinistic ambitions shown, in a varying degree, by all the States, and is severe on the handicap produced by the armament policy carried on by all, which has constituted a burden too heavy for the resources of any of the States. He considers that Serbia has suffered severely from the low moral character of the last representatives of the Obrenovitch dynasty, as well as from her geographical position in relation to Austria-Hungary, a State which has always sought to weaken the country by every means in its power. For Bulgaria, Greece, and Montenegro, however, he finds few excuses for the unfavourable condition of internal affairs in 1915.

While the book will serve a useful purpose if it helps to eliminate that unreasoning foreign glorification of particular Balkan States at the expense of their neighbours, which has done so much harm in the past, and assists the Western peoples to take a sober view of the whole area and of its complex problems, it would, we think, not be difficult to show that the author's concentration on internal politics, and his exclusion of all other aspects of national life, have led him to take a view which errs as much on the side of pessimism as those of some other authors have on the side of optimism. He sees but little hope that the future will be better than the past. But surely if the present war results in the Turk being deprived for ever of his power of doing mischief in the Balkans, and if the Great Powers, whose rivalries and interference have hitherto been so potent an evil, can agree upon a stable and just policy in the Near East for the future, we are justified in a hope that the Christian Balkan States may succeed in overcoming their internal difficulties, as other States in the past have overcome their own no less serious ones.

GENERAL.

Roving and Fighting: Adventures under Four Flags. By Major Edward S. O'Reilly. London: T. Werner Laurie, 1918. *Price* 11*s.* 6*d.*

The fighting mentioned in the title of this book has nothing to do with the present war. The author enlisted, as a boy of seventeen, in the American army at the time of the Spanish-American war, took part in the Cuban campaign, and was sent subsequently to the Philippines on police duty. Before his troopship

arrived at the islands the insurrection had broken out, and for two years he took part in the fighting there. On being discharged, after a very severe attack of fever, he set out for the States on a transport which broke down at Kobe. Mr. O'Reilly decided to occupy the time of waiting for repairs in seeing Japan, and lingered at Kioto so long that the ship sailed without him. Ultimately he found his own way to Shanghai, enlisted in the International Police service there, and later entered the Chinese Imperial army as a foreign drill instructor. Tiring of this, he returned finally to the States practically penniless, reaching his home after five years' absence. The rest of the book contains an account of his experiences as a soldier of fortune in Venezuela and Mexico. Of the latter unhappy country, and of the cruelties which accompany the ceaseless fighting, he gives a terrible picture.

Though not a travel book in the ordinary sense, the volume gives vivid little sketches of life in distant lands, the descriptions of experiences in the Philippines being especially striking. Relatively short also as was the author's sojourn in Japan, the fact that while there he was constrained to work for his living brought him experiences very different from those of the ordinary tourist. His account of a Japanese picnic to the maple-groves near Kioto in which he took part, for example, brings out an aspect of the life of the people which is apt to be overlooked in discussions of modern Japan. The picnickers sat for hours absorbed in silent contemplation of the shadows and autumn tints of the trees, their appreciation in many cases finding expression in verses which were pinned to the trees. There is a charming picture also of a little Japanese girl, six years old, who made friends with the author, and rode on his shoulder through the maple woods talking to the trees as if they had been living beings, and offering them a respectful greeting.

The book is illustrated by a number of photographs.

EDUCATIONAL.

Map Work. By V. Seymour Bryant, M.A., Major, Unattached List T.F., Assistant Master at Wellington College, and T. H. Hughes, Professional Associate of the Surveyors' Institution, Lieut. Artists' Rifles, attached Field Survey Company, R.E., Late Instructor in Map-Reading to No. 75 Cadet Unit. Oxford: at the Clarendon Press, 1918. *Price* 5*s.*

This is an excellent book on elementary map-construction and map-reading. It has been written by two experts on the subject, and they had the advantage of having the proofs read by Colonel Sir Frederick Close, C.B., C.M.G., K.B.E., the present Director-General of the Ordnance Survey. The present war has emphasised the importance of geography and map-work, and a number of small volumes dealing with the subject have appeared on the market, but for fulness of detail nothing has been published equal to this volume. It is essentially elementary, and the student will find plenty of examples, illustrations, and diagrams to assist him. At a time when so many men have had to take up arms and go through a course of education, which in normal times took two to three years, but which, under pressure of war, had to be done in as many months, it is necessary to have the information so placed that "he may run that readeth it," and the authors of this work may claim to have done this.

The use of the various surveying instruments, such as the Prismatic Compass, Clinometer, Plane-table, and Aneroid, and the methods for taking bearings, contouring, and hashuring—the making of plasticene models of topographical features, panorama and perspective sketching, are all fully explained. In addition to the method of enlarging by squares shown on pp. 116-18, the authors might have

mentioned the use of the pantograph and eidograph, and also of photography, for that purpose. The method of surveying fields and small areas shown on pp. 21-4 is geometrically correct, but the trained surveyor would adopt a simpler and more expeditious method.

The book can be recommended to all who wish to become familiar with map-work, especially those engaged on military topography.

BOOKS RECEIVED.

Sidelights on Scottish History. By Michael Barrett, O.S.B. Demy 8vo. Pp. 244. London: Sands and Co., 1918. *Price* 6*s.* 6*d. net.*

La Face de la Terre. Par Ed. Suess. Traduit avec l'autorisation de l'Auteur et annoté sous la direction d'Emmanuel de Margerie. Tables Générales de l'ouvrage. Tome i., ii., iii. Tome iii., 4me. Partie Fin, avec un Epilogue, par Pierre Termier. 2 cartes en couleur, 3 planches et 115 figures. Royal 8vo. Pp. xx + 1361-1724. Paris: Armand Colin, 1918. *Price* 30 *fr.*

[*Presented by the Translator.*

The Playground of the Far East. By the Rev. Walter Weston. With Maps and Illustrations. Demy 8vo. Pp. xiii + 333. London: John Murray, 1918. *Price* 18*s. net.*

Public Administration in the Highlands and Islands of Scotland. By John Percival Day, B.A., D.Sc. With Diagrams and Maps. Royal 8vo. Pp. vi + 407. University of London Press, 1918. *Price* 25*s.*

[*Presented by the Author.*

Art and Man. By Edwin S. Balch and Eugenia M. Balch. With Illustrations. Royal 8vo. Pp. 268. Philadelphia: Allen, Lane and Scott, 1918.

[*Presented by the Authors.*

The Question of Alsace-Lorraine. By Thomas W. Balch. With Illustrations. Royal 8vo. Pp. 84. Philadelphia: Allen, Lane and Scott, 1918.

[*Presented by the Author.*

La Belgique Industrielle et Commerciale de demain. Par Robert Billiard. Small royal 8vo. Pp. xix + 275. Paris: Berger-Levrault, 1915. *Price* 3*s.* 6*d. net.* Presented by Professor Noël, Antwerp.

Secrets of the Bosphorus revealed by Ambassador Henry Morgenthau. With 19 Illustrations. Crown 8vo. Pp. xi + 275. London: Hutchinson and Co., 1918. *Price* 8*s.* 6*d. net.*

The American Pocket Guide Book to Places of Interest in Great Britain and Ireland. With Maps. Foolscap 8vo. Pp. 185. London: Philip and Son, Ltd. *Price* 3*s.* 6*d. net.*

Native Races and Their Rulers: Sketches and Studies of Official Life and Administrative Problems in Nigeria. By C. L. Temple, C.M.G., etc., late Lieut. Governor Northern Provinces, Nigeria. With Illustrations by the Author. Demy 8vo. Pp. xi + 252. Cape Town: "Argus" Printing and Publishing Co., Ltd., London Agents, Way and Co., 1918. *Price* 6*s.* 6*d. net.*

Topography and Strategy in the War. By Douglas W. Johnson. With Maps and Illustrations. Demy 8vo. Pp. x + 211. London: Constable and Co., Ltd., 1918. *Price* 10*s.* 6*d. net.*

The Turks of Central Asia in History and at the Present Day. By M. A. Czaplicka. With Map. Royal small 8vo. Pp. 242. Oxford: at the Clarendon Press, 1918. *Price* 15*s net.*

Nederlandsch. Oost- en West-Indie. By D. Aitton. With Illustrations. Small royal 8vo. Pp. 192. Groningen: P. Noordhoff, 1913. *Price* 1 *fr.* 50 *c.*
[*Presented by Professor Nöel, Antwerp.*

Contouring and Map-Reading. By B. C. Wallis, B.Sc. Pp. 47. Macmillan and Co., Ltd.

Geographical Exercise Books. VII. *Physical Geography.* With Questions. By B. C. Wallis, B.Sc. Macmillan and Co., Ltd.

Geography in Education. By Members of the Geographical Association. Pp. 45. Philip and Son, Ltd.

British Guiana Blue-Book, 1917. Demerara: Printed by the "Argosy" Co., Ltd., Georgetown, 1918.

Report of the Commission Appointed to Delimit the Boundary between the Provinces of Alberta and British Columbia. Part I., from 1913 to 1916. Ottawa: Office of the Surveyor-General, 1917.

Transactions of the Highland and Agricultural Society of Scotland. Fifth Series. Vol. xxx. Edinburgh: W. Blackwood and Sons, 1918.

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

NEW MAPS.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st April to 30th June 1918:—

One-inch Map. In Black Outline. Price 1s. each. Sheets 11, 23, 24, 25, 26, 29, 30, 31, 32, 33, 34, 38, 39, 40, 41, 48, 49, 56, 57, 57A, 73, 92, 94, 114.

1:2500 Scale Maps revised, with houses stippled and with areas. Price 5s. each. *Dumbartonshire.* Sheets **N 5**—11, 14, 15; **N 9**—12; **N 11**—13: **N 15**—2: **N 19**—11, 16; **N 23**—10, 11; **N 24**—2, 6. *Dumbartonshire* (Det.). —Sheets **N 28**—14, 15; **N 29**—6, 10; **N 32**—12; **N 33**—9, 10. *Stirlingshire.* —Sheets **N 8**—6, 10; **N 10**—13, 14; **N 11**—12, 15, 16; **N 14**—10, 12; **N 15**—1, 2, 3, 4, 5, 7, 12, 13, 14, 15; **N 17**—3, 6, 7, 8, 10, 11, 13, 16; **N 20**—2; **N 21**—5, 6, 8; **N 23**—4, 9, 11, 15, 16; **N 26**—11, 16: **N 27**—1, 10, 12: **N 28**—4, 7, 14, 15; **N 29**—3, 6, 7, 10; **N 30**—7, 8; **N 32**—2, 6, 8. Price 3s. each—*Dumbartonshire.*—Sheet **N 23**—9. *Stirlingshire.*—Sheets **N 8**—2; **N 9**—9, 10, 11; **N 10**—11; **N 11**—(10 and 13).

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ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st July to 30th September 1918:—

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—1, 5, 9, 10. **Dumbartonshire* Det. . Sheets **N 28**—12, 16; **N 33**—1, 2, 3, 4, 6, 7, 8. **Stirlingshire.*—Sheets **N 8**—11, 14, 15; **N 9**—14, 16; **N 13**—15; **N 14**—2, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 16; **N 19**—12; **N 20**—1, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 16; **N 21**—1, 3, 7; **N 22**—15; **N 23**—8; **N 26**—3, 4, 7, 8, 12; **N 27**—5, 6, 7, 8, 9, 11, 13, 14, 15, 16; **N 28**—5, 9, 11, 12, 16; **N 29**—4; **N 30**—1; **N 32**—1, 3, 4, 5, 7; **N 33**—1, 2. *Revised on new meridian, the plan numerals therefore differ from those of the previous Revision.

Note.—There are no coloured editions of these Sheets, and the unrevised impressions have been withdrawn from sale.

GEOLOGICAL SURVEY OF SCOTLAND. Scale 1 inch to a mile. New Series, colour printed. Price 2s. 6d. each sheet.

Sheet 74, Grantown-on-Spey, 1917. **Sheet 83, Inverness**, 1918.

Ordnance Survey Office, Southampton.

On these interesting sheets the solid geology is shown in colours, and the drift by symbols in black. Dr. Peach and Dr. Horne, with Messrs. Hinxman and Grant Wilson, are specially associated with the survey work on these sheets.

ADMIRALTY CHARTS OF SCOTLAND.—New editions.

River Forth, Port Edgar to Carron River, 1918. No. 114 *c*. Price 4s.

Plans in the Firth of Forth.—Granton Harbour, Leith Docks, Grangemouth Docks, 1918. No. 3724. Price 2s.

Plans in the Firth of Forth.—Methil Docks and Anchorage, Burntisland Harbour and Docks, Kirkcaldy Harbour, 1918. No. 137. Price 3s.

Inverness Firth and Beauly Basin, 1918.—No. 1451. Price 3s.

Admiralty Office, London.

BARTHOLOMEW'S HALF-INCH TO MILE MAP OF SCOTLAND.

Sheet 11. Oban. Orographical colouring and Roads. New edition, 1918. Price 2s. 6d. mounted on cloth.

BARTHOLOMEW'S RAILWAY MAP OF THE BRITISH ISLES.—Scale 19 miles to an inch. With inset Maps. New edition, 1918. Price 1s. 6d. paper; 3s. 6d. mounted on cloth.

BARTHOLOMEW'S PLAN OF LONDON. Scale 3 inches to a mile. New edition, 1918. Price 1s. paper; 2s. 6d. mounted on cloth.

John Bartholomew and Co., Edinburgh.

LA DALMAZIA.—Atlante di 22 tavole a colori comprendenti 60 carte. Par Giotto Dainelli, Professore di Geografia nella R. Università di Pisa, 1918.

Istituto Geografico di Agostini, Novara.

This atlas gives a most admirable summary of all the aspects of Dalmatian geography. In a series of beautifully executed maps we find clearly depicted the orography, geology, meteorology, agriculture, and ethnography, whilst a supplementary series illustrates the historical evolution of the country.

HELLENISM IN THE NEAR EAST. An ethnological map compiled from the latest statistics by Professor George Soteriadis of the University of Athens. Scale 1 : 2,155,000. 1918. Price 2s. 6d. net.

Edward Stanford, Ltd., London.

This map aims at a reliable representation of the ethnological features of the Balkan Peninsula, and is specially designed to correct the inaccuracies of various other maps now in circulation. The author is Professor of History in the Univer-

sity of Athens, and has been at considerable pains to base his work on the latest statistics. These are printed as supplementary text.

EUROPEAN RUSSIA.—Showing approximate boundaries of Russian States which have declared their independence. Scale 1 : 4,500,000. In 2 sheets. 1918. Price 1s. 6d. per sheet. *George Philip and Son, Ltd., London.*

This map attempts to show the various political developments since the Treaty of Brest-Litovsk in March 1918. Of the ten republics and four principalities here outlined, it is very doubtful how many will survive their birth.

AMERICA.

DOMINION OF CANADA.—Geographical Index Charts showing the Maps in the collection of the Geographic Board of Canada. Twelve sheets. With a printed catalogue giving particulars of each map. Corrected to 1st January 1918. *The Geographic Board of Canada, Ottawa.*

A most useful reference publication for the cartography of Canada.

ALBERTA AND BRITISH COLUMBIA.—Atlas accompanying the Report of the Commission appointed to delimit the Boundary between the Provinces of Alberta and British Columbia. Part I. from 1913 to 1916. A series of 24 maps on scale of 1 : 62,500, or about 1 inch to a mile. 1917.
Office of Surveyor-General, Ottawa.

This beautiful atlas is evidence of the thorough manner in which the Boundary Commissioners have done their work.

ALBERTA.—Map of Waterton Lakes Park. Scale 1 : 100,000, or 1 : 58 miles to an inch. Drawn at the Surveyor-General's Office, Ottawa, 1918.
Department of the Interior, Ottawa.

MANITOBA, SASKATCHEWAN, AND ALBERTA.—Map showing the number of Quarter Sections available for Homestead Entry in each Township. Scale 35 miles to an inch. Prepared in the Natural Resources Intelligence Branch under the direction of F. C. C. Lynch, Superintendent.
Department of the Interior, Ottawa.

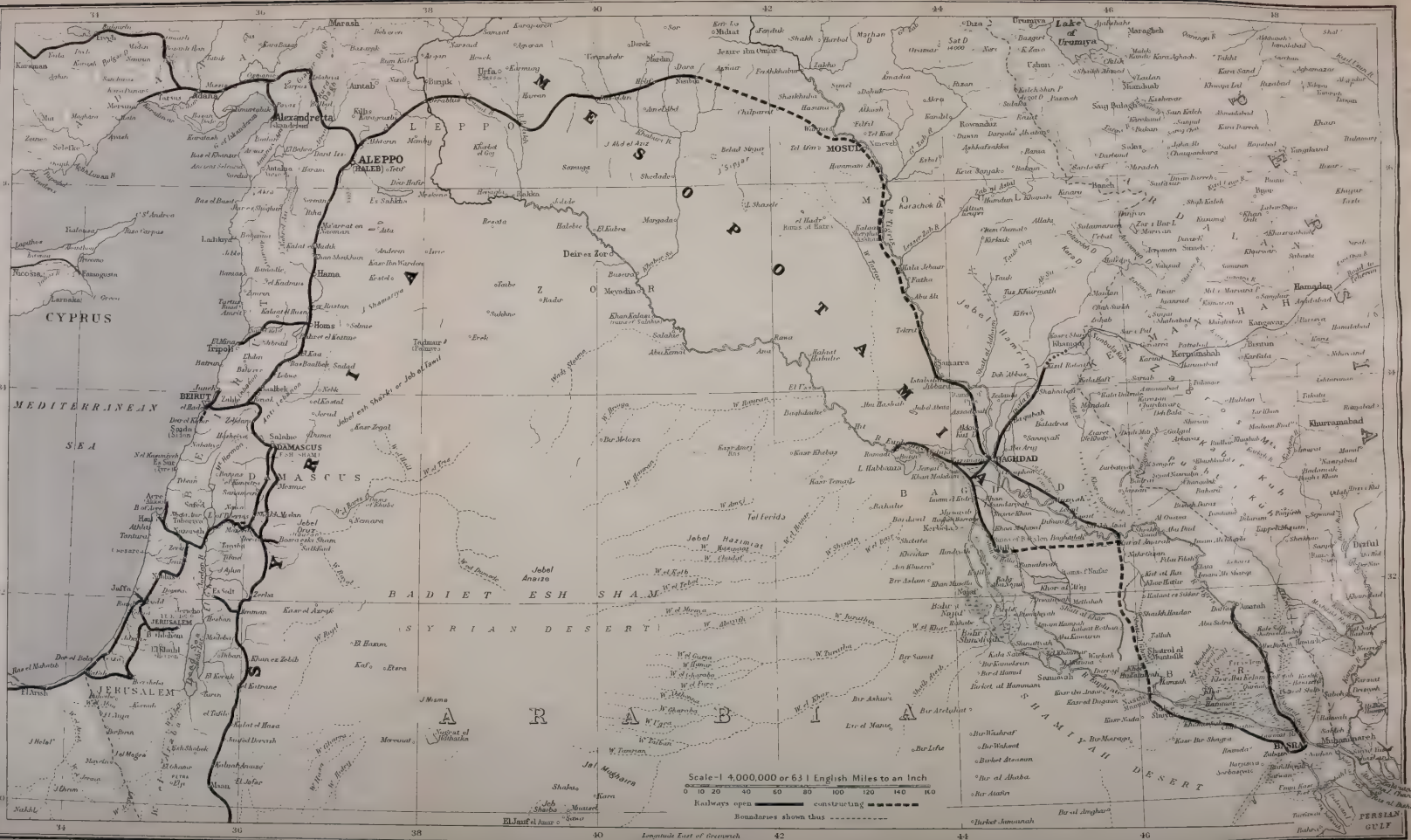
NORTHERN ALBERTA.—Map showing the Disposition of Lands. Corrected to July 1918. Scale 1 : 792,000, or 12½ miles to an inch.

SASKATCHEWAN.—Map showing the Disposition of Lands. Corrected to July 1918. Scale 1 : 792,000, or 12½ miles to an inch.
Department of the Interior, Ottawa.

GENERAL.

ADMIRALTY CHARTS.

North Atlantic Ocean, Eastern Portion. New edition, 1918.
No. 2060 A. Price 5s.
North Atlantic Ocean, Western Portion. New edition, 1918.
No. 2060 B. Price 5s.
North Atlantic Ocean, General Chart. New edition, 1917.
No. 2059. Price 4s. *Admiralty Office, London.*


MESOPOTAMIA
ALEPPO (HALEB)
Alexandretta
Adana
Aintab
Marash
Hama
Homs
Tripoli
BEIRUT
DAMASCUS
JERUSALEM
Jaffa
Haifa
Acre
Nazareth
Tiberias
Deir ez Zor
MOSUL
Lake Urumiya
Kirkuk
Kifri
Tuz Khurmath
Kerind
Kermanshah
Hamadan
Khurramabad
BAGHDAD
Kerbela
Najaf
Hillah
Samawah
Diwaniyah
Nasiriyah
Shatt al Hai
Shatt al Hindiyah
Amara
Kut el Amara
Ahwaz
Mohammerah
BASRA
Fao
PERSIAN GULF
CYPRUS
MEDITERRANEAN SEA
SYRIAN DESERT
ARABIA
Jebel Hamrin
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Jebel Hazimiat
Jebel Anaiza
Jebel Shammar
Euphrates
Tigris
Scale—1 4,000,000 or 63 1 English Miles to an Inch
0 10 20 40 60 80 100 120 140 160
Railways open
constructing
Boundaries shown thus
Longitude East of Greenwich

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE POLISH PROBLEM.[1]

By MARION I. NEWBIGIN, D.Sc. (Lond.).

(*With Sketch-Map and Illustrations.*)

OF the problems which face the Peace Conference, not the least difficult is that of the drawing of satisfactory boundaries for the new Republic of Poland, and it is one with which as yet little progress has been made. At present New Poland is, or has been, in armed conflict on all her undefined borders: with the German armies or with "Russians" on the north-east, with the Ukrainians on the south-east, with the Czechs on the south-west, and with the Germans on the west and north. The internal conditions are also bad, and in this combination of calamities, following upon the destruction of the war, we have a clear indication of the complexity of the problem which both New Poland and the *post-bellum* world have to face.

Complex as the problem is, however, its essential features can be stated in relatively little space, and the opportunity presented by the issue of the small encyclopædia named below, with its wealth of statistics, may be utilised in an endeavour to outline these.

The accompanying sketch-map has been drawn to bring out four sets of facts, all of prime importance:—

(1) Poland prior to the three partitions of 1772, 1793, and 1795—the so-called Republic—is indicated by light stippling. It included

[1] *Poland: Her People, History, Industries, Finance, Science, Literature, Art, and Social Development.* With numerous Maps. (An authorised English version of "Petite Encyclopédie Polonaise," edited by Erasmus Piltz, and compiled by E. Woroniecki, S. S. Zaleski, and J. Perlowski.) London: Herbert Jenkins, 1919. Price 6s. net.

POLAND & THE NEW RUSSIAN BORDER STATES

Bartholomew Edin

some 283,500 sq. miles, apart from the Duchy of Courland (about 10,800 sq. miles), which was a Polish fief; the size may perhaps be appreciated by remembering that the Austria-Hungary of 1914 measured only 261,000 sq. miles.

(2) The Kingdom of Poland, erected by the Congress of Vienna in 1815, and then united to the Russian Crown, is shown by oblique shading. It is very much smaller, including only some 49,000 sq. miles (rather less than England, excluding Wales), and is cut off from the Lower Vistula, and thus from the sea, by German territory.

(3) To the north and south-west of the Kingdom vertical shading shows areas which were lost to the Republic before the first partition, but which are claimed by the Poles as containing a majority of their compatriots. The lands indicated are (1) the small Zips area, north of the Carpathians, a part of which was lost to the Republic in 1769; (2) Silesia, lost to Poland so long ago as 1336, but containing in the Oppeln region (Prussian Silesia) and the Teschen region (Austrian Silesia) Polish majorities to-day; (3) areas in East Prussia, parts of which were lost in the period between 1466 and 1600, but in which the Poles still claim local majorities.

(4) To the east of the Kingdom, and overlapping the territory of the Republic, boundary lines have been drawn to show the approximate limits of some of the new Russian Border States. (These States have adopted, it should be noted, names which in pre-revolutionary Russia had a different meaning, see p. 85.).

Taking the facts as shown on the map at their face value, it is clear that, in defining a New Poland, we might begin *either* with the Republic *or* with the Kingdom. An obvious objection to the first course is that it would involve a complete refusal to recognise the existence of the new Border States of Lithuania, White Russia, and the Ukraine. It may be said that these are unstable, have shown few signs of vitality, and form therefore only a theoretical objection to a new Great Poland. It is therefore necessary to show that, in the case at least of Lithuania and the Ukraine, whether the present States survive or not, there is among the majority of their inhabitants a development of national feeling which would make the attempt to unite them forcibly under Polish rule disastrous. At the moment, indeed, it would not appear that any responsible body of Polish opinion contemplates such a union.

On the other hand, to insist that the Kingdom, and the Kingdom alone, should form the new Polish State would be to ignore the intense national feeling which exists in lands outside its limits, especially in those which were in 1914 under Austrian or German rule. We have therefore to consider, as the first element in our problem, the present distribution of the Poles. The nascent Republic of to-day claims that to the former Kingdom must be added German, Austrian, and Russian territories, producing a State which will be intermediate in size between the Poland of 1772 and that of 1815. The Poles base their claims, like the members of the proposed new States elsewhere, primarily on the existence of solid blocks of their fellows, showing strong national feeling, in the areas which they seek to include: but, like the other new

States, they hold that economic, if not strategic, conditions must also be taken into account.

It is, of course, a relatively simple matter to determine the areas in which Poles form a notable majority of the inhabitants, and thus to fix, from this point of view, the areas to which they are entitled. The insertion of the word *relatively* is necessary, for the Poles, no less than the other hitherto oppressed peoples, believe that official figures do not always represent the actual facts, and that, even if there be no direct fraud, administrative areas have been in some cases defined with the object of preventing them from claiming an absolute majority in particular districts. The figures given must therefore be regarded in some cases as only approximate; they have been taken from the encyclopædia named above.

In considering the present distribution of Poles in Europe—for over three millions have emigrated to the New World—it is convenient to consider separately the lands in the possession of the three partitioning powers, Russia, Austria, and Prussia. We may conveniently begin with Russia, who obtained the lion's share of the spoil.

1. Russian Poland.

As the result of the partitions Russia annexed about 228,700 sq. miles of Polish territory, and in 1910 this territory contained 11,438,000[1] Poles, or more than half the total number in Europe (21,376,000). Large as this number is, however, it is not proportionate to the amount of land seized. Russia appropriated 79 per cent. of the Polish lands, but in 1910 these contained only 56 per cent. of the Polish population of Europe. The fact suggests at once a fundamental fact, which has an important bearing on the origin of the new Russian Border States—that the Poland of 1772 contained much territory which was not truly Polish. In point of fact, in the centuries before Great Russia was constituted, the Polish State, largely as a result of dynastic combinations, had spread eastward over a wide area, then of uncertain or undeveloped nationality.

Thus, in 1340, Casimir the Great inherited the palatinate of Ruthenia, and, in consequence, ruled over lands stretching southwards to the mouths of the Danube, and eastwards beyond the Dnieper. In 1386 the union of the crowns of Lithuania (not identical, be it noted, with the new Lithuania of to-day) and Poland further increased Polish territory to the east. But into the areas so absorbed Polish emigration did not take place on a large scale, the Poles in these eastern lands being for the most part land-owning nobles, whose lands were worked, chiefly but not exclusively, by autochthonous peasants. Since even in the heart of the early Poland, with a purely Polish population, there was little community of feeling between peasant and noble, it was scarcely to be expected that any such community should develop between the Lithuanian, White Russian, or Ruthenian (Ukrainian) peasants and

[1] Exclusive of nearly half a million who live in other parts of Russia.

their lords. The *Polish Encyclopædia* claims that in these lands the Poles exercised "a strong political, economic, and civilising influence," but admits that in the years before the war a steady rise of national feeling was manifest both among the Lithuanians and the Ruthenians (Ukrainians).

That spirit of nationality has expressed itself, since the book was written, in the foundation of the three new border States of Lithuania, White Russia, and the Ukraine. Since also their foundation followed upon the Russian revolutions, and the widespread seizure of land by the peasants, any proposal to reinstate Polish authority would appear doomed to failure.

This statement can be justified by a consideration of the actual composition of the population of the new Border States, but, since their boundaries are vague, we must take as the basis of the discussion the pre-war Russian governments.

Lithuania in the old sense (not the new, see Map) consisted of the Russian governments of Vilna, Kovno, and Grodno. In these three the Poles form only 18·5 per cent. of a population largely Lithuanian, the total population being about 5¾ millions. The percentage of Poles is highest in Vilna, lowest in Kovno, but since the Poles are more urban than the Lithuanians, they have an absolute majority in the towns (as distinct from the governments) of Vilna and Kovno. The policy of the Russian Government was consistently anti-Polish, but it was also anti-Lithuanian, in accordance with its usual centralising nature. Some frontier modifications the new Poland can doubtless claim in this region, but not more.

White Russia in the old sense consisted of the three governments of Minsk, Vitebsk, and Mohilev. Here the Polish percentage sinks to 7·5 per cent., being least in Mohilev, the most easterly division. But, despite their small numbers, the Poles hold much of the land. According to the map issued by the Polish Information Committee, the percentage of the total land owned by them rises to 50 per cent. in Minsk. The White Russians, forming the great majority of the population, are for the most part, apparently, poor and depressed peasants. On White Russian territory it would not appear that the new Poland can have much claim, though the considerable Polish element in the towns may present a difficulty, and Polish influence is said to be strong.

South-west Ruthenia formerly consisted of the three governments of Volhynia, Podolia, and Kiev, now included in the new Ukraine State. In the three governments taken together the Poles form only under 7 per cent. of the total population, the percentage being highest in Volhynia and least in Kiev. Again, however, Poles own a high percentage of the lands. In the government of Kiev under 3 per cent. of Poles own over 40 per cent. of the lands. The problem is complicated by the fact that the Ukrainians of Russia are the same people as the Ruthenians of Galicia. The Ukrainians in Russia carried on, before the war, a fierce conflict with the Imperial Government, and have both intense national feeling and a strong sense of solidarity with the Ruthenians of Galicia. In Galicia, where for long the Ruthenians formed an uneducated

peasantry face to face with a land-owning Polish nobility, the conflict with the Poles before the war was acute, and the Galician Ruthenians have made considerable strides. There can be no question, then, of the New Poland obtaining any territory in the Ukraine area. Before the Armistice the two parties were already at loggerheads over the Cholm region, which the Ukrainians wished to include in their territories, and recently they have been disputing over the division of Galicia. The question as to whether Polish landowners are to receive compensation for the forcible expropriation of their lands in the Ukraine will probably give rise to difficulties. It would appear almost certain that these lands have been already to a large extent seized by the Ukrainian peasants.

Warsaw, the Lazienki Palace (Seventeenth Century).—From *Poland and the Polish Question.*

In the whole of the nine governments named the Polish population is about $2\frac{1}{2}$ millions. What proportion of these would be included in the New Poland by modifications of the frontier between the Kingdom and Lithuania and, possibly, White Russia, it appears to be impossible to find out, but that a considerable number would be left behind in the Border States seems inevitable, unless migration occurs.

Of the Polish territories annexed by Russia there remains for consideration only the Kingdom, with 9,000,000 Poles, forming 74 per cent. of the total population there. As the figures suggest, the conditions here are very different from those prevailing in the new Border States. Even here, however, in the nucleus of the Poland of the future, we have to notice that the population is not purely Polish, 14 per cent. of Jews forming an element of great social and economic significance, and one which adds notably to Poland's difficulties.

The foundation by the Congress of Vienna, out of a part of the Duchy of Warsaw, of the Kingdom of Poland, with that town as capital, and with the promise of national rights, had in it at least an element of statesmanship. But the Congress omitted to provide for the carrying out of the promises made to the Poles, or to allow for the impossible position created by the separation, by state frontiers, of two other centres of intense national feeling—Posen and Cracow—from Warsaw.

The Castle Hill or Wawel at Cracow, with the Vistula. – From *Poland and the Polish Question*.

In consequence, for a hundred years the history of the Kingdom was one of almost constant oppression on the part of the Russian Government, and of smouldering or active revolt on the part of the Poles. The only gain which has resulted to the Poles of the Kingdom from their union with Russia has been an intensification of national feeling, and a deeper sense of national unity. In the Republic this feeling scarcely existed as between peasants and nobles, and in Galicia, where the Poles of late years have had much freedom, it appears to be less marked.

2. Austro-Hungarian Poland.

Of the other partitioning Powers, Austria-Hungary rules over 5,179,000 Poles, but by far the greater majority of these (4,672,000) live in Galicia. In Galicia the Poles have an absolute majority, forming over 58 per cent. of the total population, while the Ruthenians constitute over 40 per cent. of the remainder. But these figures fail to bring out the actual distribution of the two great nationalities. In Western Galicia the Poles form an almost solid block, and this area, with Cracow as its centre, must inevitably fall to the new Polish State. But in Eastern Galicia the Poles are in a minority (over 36 per cent.) as against the Ruthenians (nearly 57 per cent.). As in Lithuania, however, the position is complicated by the urban habit of the Poles as compared with the rural Ruthenians. Thus Lemberg, though placed in Ruthenian Galicia, is almost purely Polish and Jewish, the Jews in Galicia—in contrast with those of the Kingdom and of Posen—opting for Polish nationality (note the political dominance of the Poles here, as compared with their oppressed condition under Russia in the Kingdom and under Prussia in Posen). Already, therefore, the Ukraine, with which Eastern Galicia is apparently to be united, and the New Poland are in conflict over the position of the new frontier, and whether this is, or is not, to give Lemberg to the Poles.

In the Teschen region, in Austrian Silesia, there live 235,000 Poles, and they claim a majority over the Czechs and Germans combined. The problem here is complicated by the fact that the area contains coal mines, so that an economic factor intervenes as well as the national one. The Czechs and Poles have already been in conflict here, but the question has been referred to the decision of the Peace Conference. In the small Zips area, in Hungary, there live 200,000 Poles, and this area is claimed for the New Poland. In both these areas, as contrasted with Galicia, the Poles have been oppressed by the governing Powers, with, it would appear, an associated uprush of national feeling. Small bodies of Poles are found in other parts of Austro-Hungary.

3. Prussian Poland.

There remain to be considered the Polish populations under Prussian rule. The total number of Poles in Germany is less than that in Austria, some 4,000,000, as against over 5,000,000; and further, while the Austrian Poles are concentrated in Galicia to an overwhelming extent, that is, lie on the southern border of the Kingdom, the Prussian Poles form a belt along its western and northern frontiers. The western portion of this fringe of Poles runs up to the Baltic on the left bank of the Vistula, but the northern fringe is separated from the Baltic by a solid block of Germans in the coastal portion of East Prussia, a fact which must add greatly to the difficulties of the New Poland.

Apart from Westphalia and the neighbouring regions, to which some half-million Poles have emigrated in search of work, the German Poles fall into four groups:—

(1) Over 1¼ millions live in the province of Posen, formerly a part of the Grand Duchy of Warsaw, and always a strong centre of

The Old Market and Town Hall of Posen. The Town Hall dates from the Sixteenth Century, but the Tower is a later addition.—From *Poland and the Polish Question.*

Polish feeling. Here they form 61 per cent. of the population, the German element, as in Alsace-Lorraine, being increased by the garrison and officials. At the Congress of Vienna the Poles of Posen, like those of the Kingdom, were promised various national rights and privileges.

But, as already indicated, the separation between the two created an impossible position, for it was inevitable that the Poles should strive to unite across the State frontier between them. Thus there was action and reaction between Russian policy in the Kingdom and Prussian policy in the former Grand Duchy of Posen. As is well known, the result was that in the years before the war the German oppression of Posen was steadily increasing, and with it the hatred between the Germans and the Poles.

(2) In Prussian Silesia, in the Oppeln district, there live 1,338,000 Poles, who form nearly 57 per cent. of the population. Other parts of Prussian Silesia have been completely Germanised, and the rise of an intense national feeling in the Oppeln region is apparently largely a recent phenomenon, due to the persistent—and characteristically clumsy —German oppression of the Poles. As in Austrian Silesia, the Poles in the Oppeln region belong to the lower classes, the nobles having become Germanised in the Middle Ages.

(3) In West Prussia there are about 600,000 Poles, forming 35 per cent. of the total population. But, as already stated, on the left bank of the Vistula, and near but not in Danzig, the Poles have a local majority.

(4) East Prussia contains more than a quarter of a million Poles, forming 50 per cent. of the total population in the southern part. They live chiefly in the Allenstein region, on the borders of the Kingdom, where they predominate in the rural population. The coastal belt, with the town of Königsberg, is German.

As regards the future frontiers towards Germany, on the basis of population the Poles should have the Oppeln region in Silesia, Posen, and the left bank of the Vistula, as well as the Allenstein region. They will certainly claim Danzig as their port. The new State will thus be faced with the obvious difficulty that, in pushing out a wedge to the Baltic along the Vistula, it will be cutting off the German peoples of East Prussia from those of West Prussia and Pomerania—a position of affairs which, according to all the old standards, would be highly unstable.

Any possible adjustments here are rendered difficult by the intense feeling between Germans and Poles, due to the persistently oppressive policy of the German Government. As in the Kingdom, however, that oppression has welded the Poles together. It would be unjust also not to admit that the Poles have learnt much from the Germans. Agriculture has made great strides, and bitter as has been the Polish outcry against the German attempt to use the school as a means of suppressing national life, the German educational system has yet done much for the Prussian Poles.

The account given above indicates approximately the areas to which the Poles can lay claim on the score of nationality. The question whether the New Poland, as thus constituted, would have stable frontiers is not one which we need discuss here; but there are certain social and economic problems of which a word must be said.

A very important difficulty, from more than one standpoint, results from the presence of numerous Jews in the areas inhabited by Poles. It is asserted that there are some 5¾ millions of Jews within the area which was once the Republic of Poland, representing about one-half of the Jewish population of the world. In Prussian Poland the Jews enjoy at least theoretical equality with other citizens before the law, and, so far as dress and habitat are concerned, have merged with the rest of the community. In Galicia, with similar legal rights, many of the Jews have still kept their traditional dress, and the poorer classes herd together in special quarters. In Russian territory the Jews are, of course, oppressed. In Russia proper they are limited to the Pale of Settlement, and subject there to a variety of oppressive laws; within the Kingdom, as in the Poland of earlier days, they have had better treatment, but are still subject to restrictions.

Their numbers in this part of Europe result from Polish policy from the Middle Ages onwards. In the thirteenth and fourteenth centuries they were encouraged to settle in Poland, and this at a time when they were subject to persecution in other parts of Europe. The motive of this policy, however, must be regarded as economic rather than as inspired by religious tolerance, for the Jews filled an important position in the life of the nation. The early Poland, like the countries of the west, was socially divided sharply into two groups—the land-owning nobles and the cultivating peasants. Elsewhere the rise of the towns meant the intercalation of new groupings between these two. The phenomenon is commonly described as the rise of the Middle Class, but the term seems inadequate, for the urban population necessarily consists of a great variety of social groupings. To the rise of the towns the land-owning barons almost everywhere offered a strenuous opposition. But while farther west they were unable to prevent a natural development, in Poland they were far more successful. There is little doubt that the reason is—at least in part—to be sought in the geographical fact that, before the rise of Great Russia, Poland proper had to the east an apparently illimitable tract of thinly peopled and largely unutilised land, which was colonised by the nobles. To these lands the surplus peasant population of Poland proper was directed, and the possession of them was an added source of strength to the nobles.

The need of a trading class was nevertheless felt, and this was at the back of the encouragement of the Jews. The latter were permitted in Poland to settle upon the land—a very unusual privilege in early Europe—but have not taken advantage of this privilege to any great extent. Prevented from mixing with the Polish people, very sharply limited in their spheres of activity, here, as elsewhere, the Jews tended especially to engage in the operations of commerce and finance, the latter, of course, including all grades of money-lending.

When in course of time a Polish urban population developed, as it was bound to develop, the competition of the Jews was keenly felt, and their marked separateness accentuated ill-feeling.

At the time of the partitions—and it was one great factor in making these possible—Poland had therefore a fairly acute social problem. Her

people consisted chiefly of nobles and peasants, with a slight development of an intermediate industrial class. Trade and commerce were chiefly in the hands of the Jews. There was ill-feeling between the peasants and the nobles, and both parties hated the Jews. The hundred years of partition have smoothed over one of these two conflicts, at least in the Kingdom and in Prussian Poland, but seem to have accentuated the other. During the nineteenth century, despite the opposition of the governing Powers, there was, especially in the Kingdom, a considerable development of modern industry, and an associated rise of a Polish industrial class. At the same time external oppression has helped to smooth out old internal antagonism among the Poles themselves; it has failed to increase toleration of the Jews, and has added what is called industrial unrest to Poland's earlier difficulties.

We have said that the partitioning Powers have done their best to check industry in the separated parts of Poland. In Germany this effort was part of a carefully planned and very subtle policy. The eastern territories, including the Polish areas, were earmarked as regions whose function it was to develop agriculture and feed the industrial west, while the elaborate and complex system of agricultural dumping practised by Germany at the expense of the adjacent countries was part of her policy for undermining Russia's strength. Incidentally, further, German policy as regards the Poles aimed at preventing these acquiring the wealth and power which come from modern industry. Silesia is of course highly industrialised, but it is only in Upper Silesia that the Poles have a majority.

Russia's policy was simpler. She was endeavouring to develop her own internal industries, and the more westernised Poles were serious competitors, to be checked so far as possible. Again, like Germany, she feared to put a weapon in the hands of the Poles which might help them to gain freedom.

Nevertheless industries, especially textile industries, have made considerable progress in the western part of the Kingdom; the chief effects of the efforts at suppression on the part of the autocracy appearing in low wages and bad conditions. Industry is largely financed by the Jews, but the poorer Jews, partly because of the difficulty of the Jewish Sabbath, and partly from other causes, do not take much part in factory industry. They are thus thrown back on the small workshop or home industries with which they are familiarly associated in the East End of London, especially trades connected with clothing. If factory conditions are not good by Western standards, the conditions in these trades are infinitely worse, and wages are appallingly low. Under Russian rule organisation of the workers was of course thwarted in all possible ways, and the fact that the Jews' opportunities for education, especially technical education, are scanty, make peaceful escape from the social slough apparently impossible.

The actual result the world is seeing to-day, for that body of social doctrine to which the vague name of Bolshevism is given is in large part the product of the Ghetto and the sweating-shop. It has been largely generated among the poorer Jews on the western margin of Russia;

it is difficult to doubt that in a Poland ruined by the war it will constantly rise anew.

Its "internationalism" is essentially a Jewish feature. The Jew, who is a "Pole" in Galicia, and a "German" in Posen, and able to make a livelihood under any form of government, and among any civilised people, has little sympathy with developing nationality, and, therefore, from the patriot's standpoint, is a dangerous citizen in a nascent State. These facts explain, though they do not justify, the intensification of anti-Semitic feeling in the Kingdom and in Galicia since the Armistice. It is asserted that in both anti-Jewish *pogroms* of a serious nature have occurred recently, and that the new Polish Government has failed either to punish the instigators or to provide against a repetition of the attacks.

One other element in the problem is important. The original Poland rose along a great highway of land communication between the Baltic and the Black Sea, and early Polish trade was all land trade. None of the rulers or statesmen of the early Poland were wise enough to forecast the effect of the advent of the Turk in turning the attention of the trading world from land ways to sea ways. Nor have the Poles shown any aptitude for maritime traffic. They early permitted themselves to be ousted from the shores of the Black Sea, and the invitation given to the Teutonic Knights in the early part of the thirteenth century to assist Poland in her struggles with the Baltic tribes, prepared the way for the ultimate cutting off of the country from the Baltic by German settlements. The New Poland will certainly look to trade for the wealth which is to provide for reconstruction. In so far as that trade is sea trade, whatever the fate of Danzig, it will probably tend to fall sooner or later into German hands. In so far as it is land trade the internationalised Jews will almost necessarily take a large part in it: here, again, are possibilities of instability for the new State.

Finally, if the Russian chaos continues—and it shows no signs yet of disappearing—the New Poland, by a turn of the wheel of fortune, will be brought back to a position not dissimilar to that which faced her in early days. In other words, she will be separated from Muscovy by a series of unstable, ill-organised, Border States. Will she be tempted, once again, to spread eastwards and provoke the inevitable retaliation from a growing Russia when Russia rallies?

Her future is in any case shrouded in uncertainty, and difficult as it may be to lay down suitable frontiers, and to compose the differences which already exist between her and her neighbours, more difficult problems still seem to lie beyond.

References.—In addition to the small encyclopædia mentioned on p. 81, reference should be made to Nalkowski, *Poland as a Geographical Entity* reviewed here in vol. xxxiii. p. 353; the numerous pamphlets published during the war by the Polish Information Committee in London; Mr. Ninian Hill's *Poland and the Polish Question*; Mrs. Baskerville's *The Polish Jew*; the plates on Poland in Robertson's and Bartholomew's *Historical Atlas of Modern Europe*.

The illustrations of the three Polish capitals are taken from Mr. Ninian Hill's book, by permission of the publishers, Messrs. Allen and Unwin.

HUMAN REGIONS.[1]

By H. J. Fleure, D.Sc.

Herbertson's Major Natural Regions have become an essential feature of geographical thought, and it is with no idea of replacing or even of criticising them that the present paper is written. As Herbertson well said, the major natural regions exist whether man be there or not. There is, none the less, justification for an attempt to think also of regions with more special reference to man and his work, and this attempt is one which the teacher of geography should try to make. If he is content to use only the regions based upon relief, climate, and vegetation, he is sometimes apt to treat man too much as a creature of circumstance, as fitting himself into his natural surroundings. He may then find that his critics emphasise the inadequacy of geography to help, save in a very subordinate way, in the study of human problems, for the students of these problems, working on older established lines, are one and all impressed with the importance of the human will. If, in addition to studying natural regions, we try to appreciate human regions as well, we may avoid this danger, for we shall be led to realise more and more vividly the continuous interaction and interpenetration of man and environment and the cumulative alteration of both man and the earth with the unfolding of history. Anthropology, history, and geography are a trilogy to be torn asunder only with severe loss of truth and of value to mankind.

Thinking, then, of man as a continuous source of life and of effort, we realise that his effort tends to accomplish three essential functions, namely nutrition, reproduction, and the increase of well-being, or life, new life, and good life. Without the first two a race would disappear, so there remains the third function as a basis of distinctions to be drawn between human groups. We may survey human groups with special reference to their efforts towards the good life, to the efficiency and the success of human work. Such a survey at any rate emphasises the importance of the human will and of man's power to modify his surroundings, and that is a point which geographers, and especially teachers of geography, need to emphasise.

The results of human effort stand naturally in close relation to the physical conditions of various regions, and the brief survey which follows will show that the attempt here made is not an attempt to displace older classifications. It is rather an effort to add a further one which in its present early stage of development must be merely accessory, but it can be an important accessory because it shifts the emphasis towards man.

Let us consider first certain portions of the earth's surface on which man's efforts towards the good life have led to comparatively small achievement.

The zone of equatorial rains and that of the hot steamy coasts of certain tropical lands, some islands of moist warm climates, and the

[1] A Revision of a Paper, "Régions humaines," in *Annales de Géographie*, May 1917.

denser parts of the tropical forests and jungles, are all difficult for mankind. Many parts of the forest are dark and damp, and the climate is antagonistic on all grounds. Fruits may be gathered, and some hunting is done even by the pigmies, and some tribes like the Fang make clearings for temporary villages, but the general level is low, and the pigmies, the Veddah, and other peoples are often looked upon as the lowest of mankind. A zoological analogy helps us to appreciate these human races. When we survey large groups of animals like the Mollusca or the Chordata, for example, we find at the base of each genealogical tree groups which show many lowly or primitive characters mingled with specialisations to peculiar and usually humble habits of life. The Australian Ant-eater and Duck-bill among Mammals, Amphioxus and the Ascidians and Balanoglossus at the base of the Chordates, and the Aplacophora at the base of the Molluscan stem, all show features that may be effects of race degeneration, and features that are primitive as well. The humblest types of mankind in the denser forests of the Tropics may thus be to some extent degenerate, perhaps dying-out stocks, forced by competition of better equipped peoples into the most difficult parts of the warm forests. We may thence speak of these regions as, on the whole, Regions of Debilitation, without blinking the fact that man seems to have originated on their borders. In addition to being antagonistic to most lowly peoples, these regions are usually difficult for Europeans, and we look upon them as opportunities for exploitation. It is true that in some cases patches of high ground with better climate are available for habitation and for sanatoria, and that the more wasteful gathering of rubber, woods, and other products may be tending to give place to cultivation under the direction of Europeans or half-breeds living in these better spots, while around the fringe of these regions the production of oil is making great strides. Still the problem remains with us, and it is aggravated by the fact that the European exploiters have often sought merely to carry away all they could, so the economy has been wasteful and the moral level low; the latter has been further lowered by the fact that the lowly aborigines have usually been treated as of little account.

The problem of the warm moist regions remains with us; indeed, it becomes more serious. The world cries out for industrial power, and unless it can harness the tides much more generally than any one hopes, or unless it can devise a scheme for storing energy from the sun's rays and thus make the Sahara a great centre of power supply, it will be driven to make up the deficiency of coal and water power by growing plants for alcohol in the Tropics. If, then, the industrialist fever in the temperate lands does not abate, the tropical lands are likely to be very severe problems in the future. Some peoples of higher grade than the pigmies have found it possible to live on the rivers, etc., of some of these regions, and it seems possible that Dravidian or partially Mongolian types may be able to withstand the dangers of the moist Tropics better than do Europeans. If so, their expansion over the Tropics will at any rate change the world's problems. It is of considerable interest to note that, according to some persons highly competent to speak, the

stress of the great war, and the problems of world relations after it, have already killed the old policy of a white Northern Australia.

At the other end of the scale, as regards climate, come the Regions of Hunger. Extreme cold brings physiological drought that limits plant growth, and often restricts man to the precarious produce of the chase. Extreme physical drought tells heavily against man in the deserts that are poor in oases, and in the isolated deserts into which have been pushed only comparatively lowly types of men. Parts of the Arctic Regions, Tierra del Fuego, parts of Australia, and so on, have been up till now in this dismal category, and in some regions the population is maintained by the outwandering of groups from the fringe of better lands. Some of these fringing tribes have given up the hard struggle to maintain their herds under the difficult conditions, and have thus started on the downward path. Lapland, where rather better conditions, possibilities of regular seasonal migration, and better contacts, have encouraged reindeer herding, and parts of Thibet, helped by the traditional trade through Lhasa, are raised above this level to some extent. The waterward fringes of regions of hunger, whether towards sea or inland water, find in fishing an added resource which redeems them from want, and those who know of the well-established historic links between Brittany and the Channel Isles, on the one hand, and Newfoundland on the other, will appreciate the value of fishing grounds to any community, and especially to a region where life at best is difficult.

The clearest contrast to these regions hostile towards man is afforded by those which encourage man, and give an early and good response to his effort. In these regions the emphasis is naturally placed on the good response, and they may be called Regions of Increment. One most important factor is no doubt a sufficiency and a fairly predicable alternation of sun and rain. The lands where the monsoon is not so heavy as to produce rain forest, or so light as to be apt to fail utterly, have a warm wet season, contrasted with an open one, slightly or markedly cooler. The Mediterranean lands have the opposite régime of winter rains and summer sun, and anthropology is showing bit by bit that man there was steadily rising from the palæolithic stage as the Glacial Period finally waned, and this régime, as a consequence, was establishing itself.

Analogous regions in the New World did not at any pre-Columbian period receive a population supple and fresh enough to utilise their advantages to the full, and those regions moreover are not so favourably placed for intercourse, which is a great factor of development, as is the Mediterranean. The monsoon lands have had only moderate facilities for intercourse in their early days. Both main regions of increment allow man to supply the wants of a fairly simple life with a moderate effort, and in both cases leisure to be devoted in one way or another to efforts towards a good life, for some at least of the people, is characteristic of the regions of increment. The tendency is, on the whole, to devote spare energy to matters which do not directly enhance man's control of environment. Architecture, sculpture, philosophies, painting,

carving, and so on, are characteristic both of the monsoon lands and of the Mediterranean region, and the latter has most characteristically summed up its ideals in its chosen phrase, "The City of God." Only portions of the Mediterranean regions can be included here, and the probably increased desiccation of this zone has decreased those portions, while accumulations of human mistakes (as in the old kingdom of Naples) have added their burden. Moreover, while many parts of the Mediterranean coast lands (within the limits of possible olive cultivation) were real lands of increment for the simpler, more self-contained groups of old, the increased complexity of life resulting from the development of arts and sciences made their needs more varied. The result has been that first the Mediterranean peoples spread as exploiters over neighbouring lands, and then later that the life of many parts of the Mediterranean has become impoverished with the old cultivation poorly done, and the newer exploitation of other lands left in more vigorous hands. The early response which we have indicated as so characteristic of regions of increment has left complex legacies, and many parts are anything but regions of increment so far as the present is concerned. We nevertheless keep the term here because their "early response" has done so much to determine their social character down to the present day.

A very important contrast between the two main regions of increment arises from the fact that in the Mediterranean we deal with coastal belts of a sea studded with islands, whereas the monsoon lands are sub-continental masses fanning out towards fringing seas. In the west the sea, while protecting many local individualities, gave much opportunity for enrichment of civilisation through intercourse, and coastwise trade had already spread far and wide by the beginning of the Bronze Age; in the east the sea has been rather a separator. It is worth noting in passing that as a consequence of age-long intercourse the islands studding the Mediterranean have acquired settlements of very various peoples and civilisations, and it is characteristic of many islands that in them these differences partly maintain themselves. These islands, like the parts of the British Isles, and even the little Channel Isles, retain interesting survivals of many elements side by side. Miss Semple's thesis of fusion in islands is far from being correct for many islands around Europe or for several others.

The regions of increment are said to have a low vital pressure. Conditions in some cases work to check multiplication; thought and the arts make people drop their barbarian vigour, and the climate helps in the process. They become less interested in production, and more insistent in their needs for a more complex life. Others come in and fight for them, and sometimes trade for them. The invaders have usually become a governing aristocracy like the Hellenes in Greece, the Patricians at Rome, the Franks in Gaul, the Rajputs in India, and the Mongols and Manchus in China. Through the caste system the Rajput struggles to avoid merging with the very different aborigines around him.

The darkest side of the life of regions of increment is the slavery

that has arisen again and again in the relations between indigenous peoples and waves of conquerors, but where they have merged an outburst of inspiration has often been the result. The conquerors have often influenced the language and the uppermost tiers of religious and handicraft ideas of the fused peoples, but the indigenous folk have contributed most of the blood and much of the folk tradition on which religion grows, and their share in the handiwork-types has sometimes been a great one.

Outside the monsoon lands and Mediterranean there are patches here and there in Eurasia that approach their standard, parts of the Paris Basin with sun and shelter, the Vale of Evesham, South Devon, and other neighbourhoods in Britain, and others in other lands. These little patches have given the characteristic early response in several cases.

For the reasons mentioned, and others which might be worked out, the regions of increment remote from Eurasia are interesting chiefly as regards the future.

Between the regions of increment and those hostile to man come intermediate types, for which emphasis has to be laid upon the great effort to tame nature sufficiently to start settled life with accumulation of elements of wellbeing. The initial effort has been a great one, usually because it was a fight with the temperate forest which demanded such high development as is implied by sharp metal tools for its conquest. Where the hard effort has brought a good reward, we may speak of regions of effort as against regions of difficulty where the material results are apt to be small. We must also consider regions of Nomadism, rich in some cases but hostile to the settled life. The regions of effort north of the Alps have rain at most seasons, and with this has gone a natural forest cover. Here and elsewhere the effort was for forest-conquest. In some other regions the great effort was for organisation against drought. In the Paris Basin, among the first, and in the Nile Valley and Mesopotamia, among the second, the stage of increment was soon reached. But where drought was the enemy the maintenance of strong organisation has been necessary, and while it lasted there was prosperity, protection from neighbouring nomads, and a close interweaving of religious and agricultural duties. In most parts of Britain the effort needed was greater, and the reward slower, and moreover Britain's insular conditions have helped to maintain dissimilar elements side by side, so old ways of life linger on in curious fashion. On the Prussian plain the effort had to be harder and longer, with painful results, for whereas, after the Dark Ages, France caught up the mediæval inspiration, due largely to fusion of peoples, in all its freshness, Prussia felt it only when it was muddied o'er with dogmatism and militarism. On the other hand, the regions of sterner effort have often provided rulers for regions of increment. The Franks have ruled France, the Prussians have set their mark on Germany, Scotsmen have an enormous share in the control of the British Empire, the men of the Sudanese scrub lands are about the greatest of African powers.

Looking outside Europe we may find most interesting contrasts between a land of increment and a land of effort if we compare with

one another the southern-eastern United States, on the one hand, and New England and the St. Lawrence region on the other, and we find many illustrations of the growth of a well-favoured region of effort if we study the Ohio States. Still, the region of effort which remains all important to us is Europe north of the Alps, and some of the characteristics of its development are of very general importance. The first step was the costly one, and it enforced close co-operation; in this case co-operation in the fight against the forest. The village community has been a stage in social development in the wet forests of north temperate Europe from Britain away to the edge of the steppe. It was a community on a lower level than the Mediterranean city, basing its life on unanimous obedience to tradition instead of on senatorial discussion, and its traditionalist methods were insufficient to maintain fertility.[1] Moreover, needs for clothing were greater, and implements were more necessary, with the result that efforts became more varied. The village community gave place to more individualistic use of the land and effort generally, and thus paved the way for the industrial revolution. It is interesting to watch the modern developments of expert cultivation, with their possibilities of enforcement of co-operation, probably based upon scientific experiment rather than upon tradition. If this phase could follow directly upon that of the village community in Russia, the consequences might be of very great interest and value to all mankind, for in that case agriculture and industry would grow up intertwined to the great profit of the people.

The regions of effort, with their many needs and their laborious tendencies, have been the home of the industrial revolution, based largely, it is true, upon the utilisation of coal and steam. But these furnished the opportunity that was grasped so effectively, largely because of the goad of sheer necessity in lands where fertility was difficult to maintain whatever was done. In England also, be it noted, the need of better cultivation had helped to destroy the traditionalist community and to foster individualist experiment.

The industrial regions play such an overwhelming part in modern life that, though most of them are regions of effort by origin, they should be classed by themselves in a scheme that emphasises man. This is the more important because the spread of industrialism to North Italy, and perhaps to India and China, points to the inclusion here of other types of regions. It may be claimed that industrialism has transformed for a time one region after another into a region of increment of a special type. Great financial resources have come into existence, and the spindle has triumphed over the plough. Cultivation in our country

[1] The Editor kindly and rightly points out that the problem of maintaining fertility in temperate Europe is a very difficult one for, if the cleared land is used for cereals for man, it cannot be manured without more cattle than the home fodder will keep. The problem is therefore one of creating industry which can export its products and get something in return which will either fertilise the land or help to feed either man or beast. It is noteworthy, however, that in modern times the fixation of atmospheric nitrogen by water power presages a change in the problem, while a few special localities have found special opportunities of solving the difficulty, *e.g.*, the Channel Isles with their seaweed harvests enriching originally barren soil, and some districts utilising special deposits not too far away.

has been weakened, and only the keenest organisation delayed that process in pre-war Germany. Amongst us plutocratic tendencies were converting the land into a pleasaunce for the *nouveau riche*, our specialism was destroying the fountain of real skill, and the workers were herded in the slums, fortunately with an escape to the new lands that steam was helping to open up. Now that these outlets are likely to be less free, it behoves us to supersede the slum crowd, and to link co-operative industry and agriculture together with afforestation as a foundation in many districts for a better rural life, helped by hydro-electric power and inspired by regional patriotism. In pre-war days the accumulation of money had weakened the real productive effort, and the financier, speculating with the increment of former days, was gaining the upper hand and exporting capital to develop, sometimes to exploit, new lands. The spread of industrialism from England to Germany, the indications of its spread from Germany to Russia, the industrialism of America, of Japan, and perhaps soon of the monsoon lands, spread a feverish anxiety about foreign markets, and this helped very greatly to bring on the ruin of 1914. It is noteworthy that the fever of anxiety was specially strong, for our country, in Birmingham, where so much depended upon "unseen factors," such as established connections and traditional skill and experience, while the difficulties were visible to all.

To maintain a whilom region of effort as a region of industrial increment is a task for the greatest of statesmen, if indeed it can be done at all. A much greater measure of lasting success would probably be attainable were we but careful never to forget that it is a region of effort with which we have to deal, and that the primeval effort is the true root of our social life; we cut it at our peril.

In other words, a region of specialisation in large-scale industry is not only an irritant that troubles the world's life, it is almost as certainly a pathological feature with the foreshadowing of decay written all over it. If, however, it links a more moderate industry with agriculture and tempers its ambitions about control of distant markets, it may be a healthy development avoiding the difficulties of industrial specialisation on the one hand and of complete reliance on agriculture on the other.

The regions of difficulty, of lasting difficulty, have been said to be those in which effort, at least until the advent of hydro-electric power, did not seem to bring any very marked return. These include the high mountain valleys, the plateaux with severe winters and some dry scrublands. Work is hard and harvests are poor, and the region must export population unceasingly. This fact gives them a great human importance, and their contribution of fresh life, often with the bubbling up of old enthusiasms round about it, is of the utmost value to the centres on the plains. Without their contribution the great cities would hardly maintain themselves, and so the great cities should help the remote districts for reasons far above those of water supply so often mentioned. The equipment of the exported population for the battle of life is of critical importance, and it is thus not without deep-lying cause that Scotland, Wales, and Switzerland, for example, have shown such interest

in education. One notes the special appropriateness of the utilisation of fortunes made in the big centres for educational development in the regions of difficulty, but of course the dangers of parasitism are not to be overlooked. Still, in many cases, the gifts that come back are the wealth acquired by the exported people, and their typical close attachment to their native soil is a factor which greatly lessens the dangers. The return of the emigrant to the region of difficulty is quite a feature in Wales and Scotland and in the Swiss and Central French regions.

There are unfortunately regions of such great difficulty that their population tends to remain undeveloped, and these hardly come into the above discussion; this problem is a very difficult one which cannot be directly treated here.

It is an interesting feature of regions of difficulty that they serve as refuges of old habits and old ideas which, among their valleys with poor communications, escape the systematisation they would undergo in the plain. Each valley may have its life, its survivals, its dialect, its own particular variety of dilatory freedom. This may, on the one hand, breed degeneracy through spiritual, as well as physical, inbreeding, but we should also remember that it may send forth inspiration to the world without, especially as its forms of expression are necessarily very personal ones. It lacks the material resources for architecture, painting, and sculpture, for orchestral music and opera, and it concentrates upon singing and poetry and oratory, with folk-song, folk-dance, and folk-drama, which are likely sources of inspiration for new movements that may spread to the plain and further fuller and more material expression there.

It is an interesting question whether or no the regions of difficulty in Europe are not changing in character in our day for various reasons. Firstly, hydro-electric power has already begun to transform the life of Switzerland, South Germany, the Alpine villages of Italy, and Norway, and, to some extent, Sweden. To-morrow it will probably have started the same transformation around the Spanish Meseta, and we cannot tell how parallel developments may not transform the problems of the Balkans ere long. Secondly, with the rise of big agglomerations on the plains and the appropriation of plain-lands for residences by the men who have made money, and the decay of their agriculture, which, however, may now be arrested, the importance of the hill country for food production has increased. Many hill lands naturally specialise in stock-raising, and the wear and tear of industrial life makes a diet of meat, and, if possible, milk, most important, and these are just the things the hills can supply. Moreover, whereas the new lands have tended to cut out the old ones as regards cereal production, their competition as regards meat and milk is by no means so severe. At present, with too little intensity of use of soil and too little pasture improvement, our stock farms are largely parasitic on the Tropics, the animals feed on imported food. This is a scheme which, nevertheless, adds to the financial resources of several Regions of Difficulty.

One of the central facts about regions of difficulty is their export of population and their consequent power of resistance to changes brought

in from without, and this applies both to our European regions and to others in other parts of the world.

Leaving the regions of difficulty *sens. strict.*, we come finally to the Regions of Nomadism. These are of all grades of wealth, but the life is different because there is less opportunity of settled accumulation. Towns may arise here and there, but they tend to have the character of aggregates of tents or booths, gathering perhaps around a fortress-palace-temple enclosure.

The historic importance of regions of nomadism has been so often discussed that no reiteration is needed. They send waves of invasion into the more settled lands from time to time, and even if we hesitate to accept fully Huntington's interesting ideas about quasi-regular pulsations, we can have no doubt about the general fact. The Rajputs in India, the Mongols and Manchus in China, the Turks in Anatolia and Europe, and ever so many more invaders tell us clearly enough what the grasslands have done.

French writers have said that, so long as the nomads are able to pursue their rhythmic wanderings, they are "peuples sans histoire"; they are peaceable when left to themselves, but along the ever changing border they promote disturbance and lead to military organisation, as, notably, among the Cossacks. Their tradition of preparedness, their close co-operative organisation, their patriarchal discipline, their mastery of the horse, have made them most formidable in war, but it is a commonplace observation that rarely have they known how to make their triumphs in more settled lands truly permanent.

Without opportunities for accumulation of records they take pride in oral traditions and appreciate in a high degree the power of the "Logos" as contrasted with "Grammata." They are intent on genealogies and have pride of race highly developed. Their wanderings over trackless regions give them an interest in the moon and stars, and thence have flowed many interesting consequences for both religion and learning, while the former has derived a lot of its ethic from their closely co-operative societies. When the nomads make contact from time to time with diverse civilisations they become carriers of ideas, and this applies more particularly to the nomads of poor grasslands and desert borders between the Indies and the Mediterranean. Here the nomads have been the originators, broadly, of the world's long distance trade, from of old a trade in goods of small bulk and great value; and many theorists credit these regions with great influence as regards the spreading of languages and civilisations. As in the case of the Regions of Difficulty, so here we have to inquire whether time and work are not bringing important changes. The spread of irrigation systems, Russian colonisation in Central Asia, the passing of Turkish rule, and other portents, tell us that the future of some of these lands may open up a new chapter of experience. They may become includible in the class of regions of effort in proportion as the resources of civilisation, learned elsewhere, are applied to them.

The sea, lakes, and rivers modify the character of a region in important ways.

HUMAN REGIONS.

Class.	Physical Characters.	Human Activities.	Examples.
I. Regions of Hunger.	Extreme cold or isolated deserts.	Hunting and collection of plant products.	Arctic Regions, Deserts of Australia and S. Africa.
II. Regions of Debilitation.	Equatorial rains, Tierra Caliente, overheated islands.	Collection of plant products, hunting, sometimes a little gardening and fishing.	Amazon lands, Congo Tierra Caliente generally, parts of Guinea, Madagascar Lowlands, E. Coast of Africa, parts of monsoon lands, several Pacific islands.
III. Regions of Increment.	Climate with sufficiency and regular alternation of sun and rain. Higher lands in hot regions; some oases.	Fruit cultivation, gardening, rice-growing, commerce, cities, æsthetics, engineering work, such as roads, bridges, etc.	Parts of Mediterranean Coast, Colchis, Kuban, California, S.E. United States, parts of Chili and Brazil, parts of E. Coast of Australia, parts of New Zealand, of India, and of the E. Indies, of Indo-China, of China and Japan. Some highlands in Mexico, Brazil, Uganda, Abyssinia, Madagascar. Some oases are intermediate between this and the next group.
IV. Regions of Effort.	Usually temperate climate, without too great changes. Moisture at most seasons.	Corn-growing, states organised for defence, privileges of property. Much energy for exploitation of resources.	France, British Isles, Germany, S. Scandinavia, central parts of Russian plain where not too wet, parts of the Balkans, Transvaal, Rhodesia, Manchuria, parts of Siberia, of the Sudan, most of the U.S.A., parts of the east of Central Australia, most of New Zealand.
V. Industrialised Regions.	Up to the present, temperate climate, and some natural source of industrial power. Facilities for communication.	Manufacturing, usually with intense specialisation, Agriculture threatened, but sometimes maintained by special effort (Germany). Invention and organisation. Finance.	Portions of England and of Central Lowlands of Scotland, Belfast district, N. France, and Belgium, parts of Germany, especially near the "Fall-Line," Bohemian districts, parts of Poland and Russia. Scandinavian and Alpine regions thanks to hydro-electric power. Japan, and parts of the U.S.A. and Canada. Possibilities in India, China, New Zealand, etc.
VI. Regions of Lasting Difficulty.	High valleys of temperate regions. Plateaux with cold winters.	Small farming, stock raising, herding with transhumance, exportation of men, especially for manual labour and the Mercantile Marine.	Alpine valleys, Pyrenees, Tatra, parts of Balkan Peninsula, Caucasus, Armenia, Spanish Meseta, Plateau Central, several parts of Wales, Scotland, and Scandinavia, Afghanistan, parts of Sudan, etc.
VII. Regions of Wandering.	Great variations of temperature, seasonal drought.	Herding and, in parts, hunting.	Large areas in W. and Central Asia, in Africa, in Patagonia, in U.S.A. east of the Rockies. In each case the application of the resources of civilisation acquired especially in IV. is now being foreshadowed.

The coasts of regions of increment, if indented and provided with islands to assist the old point-to-point sailing, have long been of importance for seafaring, and evidence is steadily accumulating in diverse directions, to show that coastwise navigation from the Ægean was widespread around Europe in the Bronze Age, and possibly even before its dawn. The stories of the *Odyssey*, the Argonauts, the *Æneid*; and our Western legendary histories seem to preserve for us memories of this old seafaring trade. No doubt it led to exchanges of population and ideas, but evidences show that the invaders would often be in too small bands to effect more than slight alteration in the actual population, however deep their cultural influence might be. The sea with headlands and islands was a civilising link of old, the mountains and forests rather a barrier.

The coasts of regions of difficulty, and to a large extent those of regions of effort, too, have tended to develop the fisher-farmer type of society, with interesting features, such as the power of women, correlated to some extent with the frequent absences of men at sea.[1] They have to export their men a good deal, and here the classic case is that of the Vikings going out to seek new homes. In our day coastwise sailing has diminished and the numberless little ports have decayed; they thence need to export men all the more, and they send them naturally enough into the mercantile marine. The great importance of the merchant navy of Norway since Britain took to Free Trade is a case in point. It is very characteristic that the exported men of the coasts tend to return home as their life's work ends, just as do the men of the hills and the men of the desert oases. In several regions the presence of sea, lakes, and rivers has allowed fishing and intercourse to milden what would otherwise in some cases be conditions of considerable difficulty.

The industrial system has brought grave problems to the coasts of the regions of effort. A floating population develops in the great ports, and, while some of it is of mercantile type and may be useful, much of it is almost "Pariah."

The common measure of intercourse between the cosmopolitan fragments of the population of a great port is necessarily very low, and this exerts a degrading influence only partially mitigated by the contributions made by the better type of foreigners to the city's life. The better ordering of the life of a great port with the abolition of indiscriminate slum-crowding, and perhaps the arrangement of townships for some, at any rate, of the very diverse elements, could quite possibly start a general upgrade movement that would spread far and wide from these sensitive centres of our modern life. It would be interesting, but at this stage probably unprofitable, to speculate upon the possible effects on our port life, for good on the whole, opened up by the contemporary

[1] As regards the power of women in these communities, however, it is well to remember another probable factor. Several fisher-farmer communities of W. Europe owe a great deal to traders from the E. Mediterranean in the Bronze Age, and those traders had a matriarchal social order.

spread of the industrial system to one land after another. One need but say that it involves a world-rationing system sooner or later, and probably less transfer in bulk of the simpler manufactured goods over large distances. If oil fuel or electricity is to replace coal, we may also hope to see the end of some degrading conditions in the docks areas.

In conclusion, it must be argued that the bounds of a human region must be conceived as zones, not as lines. In fact each boundary zone is really an "Intermediate Zone," and the importance of intermediate zones in human geography is very great indeed. In them various types of life and tradition meet under circumstances which uplift those of the more difficult region, for that region is here at its best. These intermediate zones are called upon to play the part of assimilators; they fuse diverse contributions to civilisation, and if they are sufficiently large they impart to the fusion a distinctive personality. In a broad sense the Paris Basin might be considered an intermediate zone between the regions of harder effort to the north and north-east and the regions of quicker increment to the south, and its rôle as an assimilator is famous in history. That its borders in Flanders and Burgundy, with their endless crossings of people for migration, commerce, and war, should have become such remarkable producers of artistic and other genius for long periods is a further point of interest.

The Ukraine (etym. *border land*) and the Steppe border generally (in Europe and Asia) seems to have contributed a good deal to the improvement of agriculture according to J. L. Myres, and many theories speak of language-spreads from the borders of the grassland. Archæology notices the development of the Tripolje culture in the Kief area, and the spread of the allied Beaker-culture westward across Europe. We may also apply the notion of a border zone to the Ægean, the shores of which so closely indicate the limit of useful cultivation of the olive; here a fringing region of increment is backed by a region of great difficulty. South Palestine is for all time the great example of the border zone between the desert and the sown. And these are lands which have contributed immensely to the development of our civilisation. The rôle of Delhi and Agra in India, and of Peking in China, all deserve consideration in somewhat analogous fashion.

It will be evident to the reader that the suggestions of this paper make human experience their keynote, and therefore necessarily take into account the changing character of that experience and its effects. There is every possibility of increased change, for the applied arts have gained mobility thanks to the increase of the common measure of knowledge between many human stocks which has followed the recent growth of intercommunication. It may be claimed that if we wish to study human problems progressively we must not be content with an emphasis on the space factor; we must see that the factor of time and the factor of type are allowed their places, and the resultant is a unity in which all three interpenetrate.

In conclusion, may it be permitted to express special thanks to the Editor for several valuable suggestions and discussions of points raised in this study.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Meeting of Council.

A Meeting of Council was held on the 30th January, when the under-mentioned ladies and gentlemen were elected Members of the Society :—

Ordinary.

Lady Guthrie.
Thomas Gascoigne.
James Fulton.
J. Douglas Reid.
Janet A. Runciman.
Rev. Dr. R. S. Simpson.
James A. Wallace.
Charles S. Romanes, C.A.
Miss E. H. C. Pagan, M.A.
Miss Zoë Dixon.
Gilbert Archer.
Duncan S. Macnair.
Prof. O. Charnock Bradley, M.D., D.Sc., F.R.S.E.
Charles H. Dinham, B.A., F.G.S.
Murray Macgregor, M.A., B.Sc.
Ronald F. R. McNeill.
Mrs. George Stevenson.
Miss Helen A. Mathieson, M.A.
T. Fulton Reid.

Associate.

Miss Isabel Carruthers, M.A.
Miss Jeanie Simpson, M.A.
Miss Sarah Wilson.
Miss Gladys C. Reid.

Diploma of Fellowship.

The Diploma of Fellowship was conferred upon Mr. Harry R. G. Inglis, in recognition of excellent work done in the surveying of roads in the United Kingdom, and of his researches on ancient bridges in many European countries.

Teaching of Geography.

In order to make the *Scottish Geographical Magazine* still more readily available to teachers, it was decided that in future any school in Scotland or the Dominions may, in its corporate capacity, receive the *Magazine* on the same terms as an individual teacher — that is, on payment of a subscription of 10s. 6d. per annum.

At a Meeting of Council held on the 18th February the following were elected Ordinary Members of the Society :—

David Murray Galloway.
John Maclean Ramsay, M.A., B.A., O.B.E.

Lectures in March and April.

Lieut.-Colonel H. S. L. Winterbotham, C.M.G., D.S.O., of the Topographical Section, G.H.Q. Staff, on "Geographical Work on the Western Front." Lantern Views. Aberdeen, 4th March ; Dundee, 5th March ; Edinburgh (Queen's Hall), 6th March ; Glasgow, 7th March.

Mrs. Mary Gaunt, on "Wanderings from the Hoang-ho to the Island of Saghalien and the Upper Reaches of the Amur River." Lantern Views. Aberdeen, 1st April; Dundee, 2nd April; Edinburgh (Queen's Hall), 3rd April; Glasgow, 4th April.

Hour of lectures 8 P.M.

GEOGRAPHICAL NOTES.

Europe.

The Limits of the Czecho-Slovak Republic.—In connection with the article on Poland which appears in this issue, it is of interest to note the following definite statement of the claims put forward by the Czecho-Slovak delegates at the Peace Conference, as published in the *Times* on February 6. The delegates claim that the Republic should extend between Poland and Prussian Silesia on the north, between Hungary and German Austria on the south, and between Poland and Rumania on the east. In detail they claim Bohemia, Moravia, Austrian Silesia, Slovakia, the part of Hungary inhabited by Ruthenians, the Czech colonies of Glatz and Ratibor in Prussian Silesia, and of Gmund in German Austria, and propose that a strip between German Austria and Hungary, passing by Pressburg and the Lake of Neusiedl, should connect Czecho-Slovak territory with Yugoslavia. They also urge that the rivers Elbe, Danube, and Vistula, and the railway lines Pressburg-Fiume, Pressburg-Trieste, and Prague-Strassburg *via* Nuremberg should be internationalised. It will be noted that the claim to the whole of Austrian Silesia clashes with the Polish claim to the Teschen region, and there will possibly also be some difficulty between the two States in Prussian Silesia.

The population of the new republic is given at 13,000,000, of whom 10,000,000 are Czechs and 3,000,000 Slovaks. But it would appear that the proposed frontiers, especially the corridor strip extending to Yugoslavia, and the proposed extension between Poland and Rumania (apparently at the expense of the Ruthenians) would include a considerable alien population.

Asia.

The Resources of Burma.—In an article contributed to the *Bulletin* of the Imperial Institute for January-March last, Sir Harvey Adamson discusses the agriculture, fisheries, forests, and minerals of Burma. The country has great natural wealth, but, except for rice, teak, and mineral oil, its resources are as yet imperfectly developed. The causes of this seem to lie in the dearness of labour, due to the relatively scanty population and the difficulties of transport. Except on the great rivers and in the tidal creeks of Arakan, there is little water-transport, and roads and railways are markedly deficient. The railways only reach a total length of 1598 miles, and there is no railway

connection between Burma and India. Theoretically there are more than 2000 miles of metalled roads, but most of the roads away from the towns are said only to be fit for bullock-cart traffic, and in the wet season great tracts of land are closed to all traffic. An adequate system of roads seems, therefore, to be a necessary condition for future progress.

Two-thirds of the cropped area is under rice, and there seems little room for an extension of this crop, though the yield could doubtless be improved. The land is worked continuously, and manure is only used in the plant nurseries. The total yield in 1916-17 was 6,913,000 tons, and 2,700,000 tons of cleaned rice were exported. Sesamum, grown in the dry area, forms the second crop so far as the area involved is concerned, but Burma does not supply her own demand for the oil, which is used in cooking, nor for the cake, which serves as cattle food. Other crops are millet, beans, ground-nuts, cotton, maize, wheat, gram, sugar-cane, tobacco, rubber, tea, and many kinds of fruit. In the forests teak far surpasses in value all other kinds of timber put together; for many of the latter no remunerative market has as yet been found. In addition to timber the forests yield a number of minor products, such as the varnish called *thitsi*, which is extensively used in Burmese lacquer work; cutch, used in tanning and dyeing; lac, and so forth.

As to minerals, coal appears to be abundant, and varies in quality from poor to good. But owing to the abundance of wood it is not used locally, and the best field, that of Chindum, is inaccessible. Petroleum is, of course, very abundant, and new fields have been discovered recently. There are a great number of minor minerals, some of which, like jade and amber, are at present worked by very primitive methods, so that the yield is capable of increase.

The late Lieut.-General Sir James Hills-Johnes' Visit to Central Asia.—Lieut.-Colonel A. C. Yate sends us the following note:—"In December 1890 I had the honour of addressing a meeting of the Royal Scottish Geographical Society assembled to hear the account that I was privileged to give of a journey to Tashkent and back in the autumn of 1890. Major-General Sir Robert Murdoch Smith, an old friend whom I had met first at Tehran in June 1881, presided on that occasion. It is a singular but noteworthy thing that in the short biographies, which have recently appeared in so many newspapers, of the late Lieut.-General Sir James Hills-Johnes, V.C., G.C.B., etc., not a reference, as far as I am aware, was made to his having devoted a couple of months, September-October 1890, to travelling in Russia and Russian Central Asia. He had retired from active service in 1888, and it was in his company that I had the pleasure of travelling from Baku to Tashkent and back to Tiflis.

"When the Russian Government invited the world to visit the first Tashkent Exhibition, and the Wagons-Lits Company organised a special service for the conveyance of the visitors, three Englishmen, Sir James Hills-Johnes, Mr. C. E. Biddulph, and myself, availed ourselves of the opportunity. At that time the Russian Government regarded the

Trans-Caspian Railway as being as much 'outside the British sphere' as Afghanistan was officially recognised to be 'outside the Russian.' As far as my memory serves me, previous British travellers on that railway were my brother, Colonel C. E. Yate, and Colonel W. Peacock, the demarcators of the Russo-Afghan frontier from the Hari-Rud to the Oxus, Lord Curzon of Kedleston, Colonel A. Lemesurier, R.E., and Mr. George Dobson, *Times* correspondent, all of whom (Colonel Peacock excepted) have bequeathed to us written accounts of their journeys. Sir James, Mr. Biddulph, and I decided independently upon this trip, and we forgathered for the first time in the Hôtel de l'Europe at Baku. Thence we crossed the Caspian to Uzunada in company with Mr. Vishnegradsky, General Annenkoff, and a number of Russian and French visitors to the Exhibition. We went straight through to Samarcand, and there, leaving Mr. Biddulph, we took tarantass to Tashkent. We did the 200 miles in thirty-six hours, thanks to General Annenkoff's courtesy and kindliness; for we were held up at Jizak, the postmaster refusing to give us horses. Sir James wired to General Annenkoff at Samarcand, and the order to give us horses came promptly. The delay cost us four hours. Our return drive from Tashkent to Samarcand took thirty-two hours. M. Paul Lessar, the well-known explorer, and, in 1890, Russian Resident at Bokhara (he died at Peking about 1900, being Russian Minister there), preceded us, and with a special *podorojna* (posting permit) covered the distance in twenty-six hours.

"We spent about a week in a hotel at Tashkent, were made honorary members of a Russian Club, and at the Exhibition and elsewhere saw proofs of progress in the industrial and agricultural development of Russian Turkestan. We were invited, too, to attend some divisional manœuvres, but had not time to accept. On our return journey Sir James took particular notice of the swing-ferry over the Syr-Darya (Jaxartes or Saihun), and I still recall the suffocating, impalpable dust that followed and enveloped us as we lay side by side in the tarantass, crossing the *loess* ('pat' it is called in Upper Sind) between Chinaz and Jizak. Returning from Samarcand to the Caspian, we stopped off for a day or two at Bokhara, where we were the guests of M. Lessar, at Amú-Darya and Merv. As we railed from Merv to Askhabad, Colonel Sir Colin Scott-Moncrieff, fresh from Egypt, with a French irrigation expert, passed us, going to Merv-i-Shah-i-Jahán (Monarch of the Earth), as Merv was entitled in the Middle Ages, to tell the Russians how to revive the irrigation from the Murghab river, which had formerly enabled Merv to maintain a population of a quarter of a million. Sir James and I parted at Tiflis, he taking the Vladikavkas-Moscow and I the Constantinople-Pesth route for England."

The Baghdad Railway and its Eastern Connections (*with Map*).—It has been announced in the Press that British forces have taken over the control of the Baghdad Railway as far west as the Amanus tunnels, and this announcement, together with others on irrigation schemes in Mesopotamia, make it desirable to illustrate the present

position of affairs in the regions concerned so far as railway communication goes.

In vol. xxxiii., p. 38, we published a sketch-map of the Baghdad Railway embodying the facts as they were then known, or so far at least as they were permitted to be published. The present map, which supplements the previous one, illustrates the changes which have occurred in the eastern part of the territory traversed, the region where they have been most numerous and striking.

The map published in 1917 showed the branch line connecting the port of Alexandretta with the main route east of Adana, and thus linking, if indirectly, that port to the town of Aleppo. In point of fact, however, it now appears that it was not until the summer of 1917 that the connection was actually completed, for the difficult section through the Amanus Mountains (Giaour Dagh on map), with its bridges and tunnels, delayed the opening. It was on this section that British prisoners of war taken at Kut and Gallipoli were largely employed by the Turks and Germans.

The labour of the British prisoners was also employed on the section between Ras-el-Ain and Nisibin, and by this means the line had been pushed to the latter place by July 1917, and beyond it in the direction of Mosul thereafter. There is still, however, a wide gap betwen Nisibin and Mosul, and also between Mosul and Tekrit, to which latter point the British had continued the Baghdad-Samara section by September 1918.

In the Baghdad-Basra section the changes have been more complicated. Basra has been converted into a modern port, and early in the war two narrow-gauge lines were built from it, one following the Euphrates to Nasrie and the other up the Tigris to Kurna (Qurnah), this being extended later to Amarah. Later again a line was built from Kut to Baghdad on the east bank of the Tigris, leaving a gap between Kut and Amarah to be filled by water communication. These are, however, chiefly strategic lines, as the main Baghdad line is to follow not the Tigris but the Euphrates. Here the opening of the Hindieh Barrage, and the construction of subsidiary canals, have made it possible to bring some 500,000 acres under cultivation since the British occupation.

In December 1917 a line was built from Baghdad to Feluja on the Euphrates, and this, which has been already lengthened, may be extended to Hit. It has already been extended southwards to Hilla, below the barrage, in the direction of the future main line. But it is not intended to continue the latter direct to Nasrie; instead a detour will be made across the fertile lands between the rivers to Kut, whence the line will run south, parallel to the Shat-el-Gharaf, to Nasrie.

In addition to these lines a branch runs north-east from Baghdad to Kizil-Robat, and is to be continued to Khanikin, where it will tap the traffic of the great Persian highway which runs *via* Kermanshah and Hamadan to Tehran. In connection with this line it is noteworthy that an important new irrigation canal has been opened on the Diala river, to which the line runs parallel, at a point some seventy miles north-east of Baghdad. This canal will make it possible to irrigate some 300,000

acres of land, and to extend cultivation to the neighbourhood of Baghdad.

The map shows also the new connection between the railways of Egypt and those of Palestine and Syria *via* El Arish. This line involved the construction of a swing-bridge over the Suez Canal at Kantara.

Polar.

The Political Status of Spitsbergen.—We hope to publish here in an early issue a paper on Spitsbergen by Dr. R. N. Rudmose Brown. Meantime we may call attention to an article on its political status, by Sir Martin Conway, published in the February issue of the *Geographical Journal*, and illustrated by some of Dr. W. S. Bruce's fine photographs. Sir Martin Conway's paper is largely historical, but he emphasises the great wealth of plant life in Spitsbergen during the growing season, and makes the interesting suggestion that now that the vast herds of wild reindeer which fed upon the natural pasturages have been exterminated, the domestic form might be introduced with the help of Lapps or Samoyedes, and, if the mining industry prospers, would help to feed the miners. He also states that eider ducks are still numerous, and the down industry could doubtless be greatly developed if adequate protection were obtained for the birds. The Arctic fox might also be re-established.

The paper is followed by a discussion, with contributions from Mr. H. G. Poynting, Dr. W. S. Bruce, Sir Aubrey Strahan, and others. The first two take a very favourable view of possible developments of the mining industry of Spitsbergen. Mr. Poynting regards Western Spitsbergen as being rich in coal and iron, both more accessible than has been supposed, and states that in addition beautiful marbles occur, together with deposits of copper, lead, asbestos, and other minerals. Sir Aubrey Strahan, on the other hand, is less sanguine. He lays stress on the fact that the best coal-seams are of Tertiary age, and states that elsewhere seams of this age are not remarkable either for their constancy or great extension. He seems uncertain about the value of the iron ore deposits.

General.

Eclipse of the Sun.—On May 29 next the sun is to be totally eclipsed along a track which crosses the entire breadth of South America and Africa, and the Joint Permanent Eclipse Committee of the Royal and Astronomical Societies is arranging to send out two parties to study the phenomenon. One station has been selected in Brazil, at Sobral in Ceara, about 80 miles inland, connected by railway with Camocim, which can be reached by steamer from Para, while the second will be placed on the Portuguese island of Principe, which is 110 miles off the mainland coast of West Africa. The two parties are to set out about the middle of March, in order to reach the observing stations three or four weeks before the eclipse occurs. So far, there is no indication that

any other country proposes to send out an expedition, but it is hoped that the South American observatories may take part in the work of the British party going to Brazil.

Economic Geography.

A Hawaiian Fibre-plant.—A short article in *Science* gives an interesting account of a fibre-plant characteristic of the Hawaiian Islands, which has not hitherto entered into commerce, and has not yet been cultivated. This is *Touchardia latifolia*, an endemic woody shrub of the nettle family. It grows to a height of four to ten feet, and divides into relatively few wand-like shoots, whose bast yields the fibre. The plant is found in the middle and lower forest zone of all the larger islands of the archipelago, especially in deep, cool ravines, or on slopes with a dense forest cover. It occurs in little patches or thickets among the other trees, is nowhere very abundant, and does not form pure stands. The bast fibres were greatly prized by the Hawaiians in earlier days, more especially for making fishing-nets and lines, for carrying-nets, for cordage, and so forth, the advantages being the great tensile strength, estimated at about three times that of commercial Manila, and the great resistance of the fibre to the action of sea-water. The plant was not cultivated in any precise sense, but patches of wild trees were tended, cleared of undergrowth, and thinned if necessary. Pruning was also practised to promote the growth of young straight shoots. Retting of the bark after it was stripped from the shoots was carried on in streams or irrigation ditches, the pulpy matter after a few days being scraped from the mass while still wet, and the fibres then dried. Every chief in the old days had his own plantation in the mountains, taxes being often paid in *olona*, the native name given to the fibre. It is now proposed that the plant should be cultivated in the islands as a source of commercial fibre.

EDUCATIONAL.

Geographical Tripos at Cambridge University.—It is announced that the Senate at Cambridge has approved the proposal to establish a Geographical Tripos, and that the examination for Part I. of this will be first held in 1920, and that for Part II. in 1921. It is recognised that the subject of Geography is so extensive and borders upon so many other sciences, that to fit a student for geographical research or higher teaching a training is necessary which is of the standard required for a Tripos. It is also suggested that such a training would be valuable for the future statesman, administrator, merchant, or missionary. The two parts of this Tripos together will qualify for an honours degree, and Part I. will qualify for the diploma in Geography, which has proved so useful that it is regarded as important that it should be retained.

Meeting of Regional Association.—We are informed that this Association is to meet this year at Malvern, April 9-16. All particulars can be obtained from Mr. George Morris, 7 West Road, Saffron Walden. It is hoped to arrange a meeting in Scotland next year.

NEW BOOKS.

EUROPE.

Le Bas-Maine: Étude Géographique. By René Musset. Paris: Armand Colin, 1917. *Price 15 fr and 20 per cent. increase.*

This is one of the elaborate regional studies to which the French geographers have already accustomed us. The area concerned is the western part of the old province of Maine, and practically coincides with the modern department of Mayenne, the eastern half of the old province forming that of the Sarthe. The area is small, comprising some 2000 square miles, and thus is approximately that of the county of Northumberland, but the devotion to it of a large volume is justified both by the fact that it is representative of a much larger region in western France, as well as in other parts of Europe, and because its economic history can be traced, step by step, from the original clearings in the primeval forest to the present day.

The Bas-Maine, which is watered by the Mayenne and its factors, itself a right-bank tributary of the Loire, is floored by ancient rocks—a marked contrast with the department of the Sarthe, where the rocks are of Secondary Age—which crumble to form a relatively infertile soil. The climate also is definitely of the Western type, with deficient sunshine and frequent, if not very heavy, precipitation. Finally, the region is relatively remote from main highways of communication, not having easy access either to the sea or to Paris, while roads and railways are few, and the former bad. Nor does any great mineral wealth compensate for the natural disadvantages. Small deposits of inferior anthracitic coal, beds of iron ore (no longer worked), marble and building stone, limestones, and so forth, do occur, but none are of any great importance. Thus the region shows a certain general resemblance, despite its southern position, to the poorer parts of the British Islands, and its economic history has been one of struggle on the part of man with unfavourable conditions, a struggle in which temporary success has frequently been followed by periods of failure and economic depression. At present, after a period of great agricultural prosperity in the earlier part of the nineteenth century, the population is diminishing.

M. Musset traces in a very interesting fashion the causation of this alternation of prosperity and depression, and though his book must have been written before the war, and takes no account of the changes due to its effects, it is one well worth careful study at a time when renewed interest is everywhere being taken in questions connected with land utilisation.

Primitively the Bas-Maine formed a part of the great European forest, and systematic clearing did not begin till about the eleventh century. By the sixteenth an apparently stable mode of life had developed in the cleared lands. Three elements entered then into the agricultural holdings: first, small areas of the best lands were devoted to food production, and in default of manure had to be cultivated on the three-field system; second, remnants of the original forest supplied wood for construction and fuel, and pasturage for the pigs; thirdly, cleared lands,

not sufficiently fertile for food production, were allowed to degenerate into heaths, and from these the cultivator periodically removed the surface soil to be added as a fertiliser to his fields, while his poorly-fed plough-oxen also pastured here as well as on the fallowed lands. The poverty was extreme, for the cereal crops often failed. In the sixteenth century the introduction of buckwheat—better suited to the climate than wheat—and of the apple tree to replace the vine, which is not suited to the climate, brought a measure of relief. Somewhat later the spread of the flax plant, and the development of an important linen industry, brought real prosperity, especially in the seventeenth and eighteenth centuries. The industry was, of course, a domestic one, carried on by the cultivators. To them it brought a rise in the standard of life, while to the merchants it brought notable prosperity. Three-fourths of the linen goods were exported, St. Malo being the port used, and they found markets both in the New and the Old Worlds. About the same time a local iron industry, dependent upon the use of wood, led, as it did in England, to a steady reduction of the area under forest.

But at the end of the eighteenth and the beginning of the nineteenth century the wars and disturbances of the period ruined the linen trade, foreign outlets being cut off, and a fresh period of depression followed. The fact that during the industrial period the land had been largely neglected, except for the careful cultivation of the flax plant, naturally augmented the poverty when the linen trade failed. The reaction came from the side of agriculture with the discovery that the infertility of the lands was largely due to a deficiency in lime. Between 1830 and 1875 lime was applied to practically all the lands, and its first effect was a sudden and marked rise in fertility. This again made a complete change in farming methods possible. It was no longer necessary to retain great tracts of uncultivated heaths side by side with the cultivated fields, and live-stock rearing on an increased scale became possible, because the ploughed land was no longer wholly reserved for food crops for man, but could be partly devoted to fodder plants. This again increased the supplies of animal manure available, and led to many minor changes in agricultural methods. But the effect of the liming process was merely to permit of the soil reserves being drawn upon, a fact not clearly realised at the time, and the first sudden increase in fertility was followed by a rapid diminution. One result has been that the population, which till 1861 was increasing, is, as already stated, now diminishing (375,000 in 1861, as against 298,000 in 1911). M. Musset considers that only a fresh development of industry can produce a change, and that for this an improvement in means of communication is necessary. In view of the stress now being laid on forestry in this country, it is remarkable that he says little of afforestation as a possible auxiliary to agriculture in the region.

Scenes of Russian Life. By Josephine Calina. London: Constable, 1918. *Price 6s. net.*

In a well-written, and always interesting narrative, the authoress tells the strange story of her life. She reminds us that in Russia "the child has no childhood. Children begin to consider the problems of life earlier than English or French children. They are thinkers and politicians when they should be playing with their games and enjoying their life of innocence." The authoress herself was in prison, as a Progressive, at the age of eighteen. She witnessed the Revolution of 1905, and a pogrom (or massacre) of the Jews, when the hooligans "joined in and wrecked the Jewish houses, outraged the girls, cut the throats of the little children, and gave to many a woman and many a man a slow, agonising death."

The prison officials were no better, for a female friend of hers was tortured, driven mad, and eventually died of the treatment she received in prison. At the same time, the book is full of beautiful descriptions of scenery and of graphic scenes of Russian life before the war in or near Kiev, the capital of the Ukraine, which she describes as "a lovely picturesque town with many trees on its hilly streets. Electric cars circulate through the city but the buildings are slightly different from those of Western Europe. On the whole, the town gives a most pleasing and satisfying scene to the eye. It has many elegant shops and an innumerable number of churches. Kiev is famed for its churches. There is the famous Mother of God which has caused so many miracles, and is a famous object of pilgrimage. From all over Russia flock people to it to be cured of their diseases."

The Guardians of the Gate: Historical Lectures on the Serbs. By R. G. D. Laffan, C.F. *With a Foreword by* Vice-Admiral E. T. Troubridge, C.B., C.M.G. Oxford: At the Clarendon Press, 1918. *Price 5s. net.*

This little book is based upon a series of lectures delivered by the author to the members of the British Motor Transport Units attached to the Serbian army, during the early part of 1917. Many of the men who listened to them showed, as we can very well believe, great interest, and the book, as the author modestly observes, was written from the lecture notes, primarily as a souvenir for the members of the British Salonika force. It is illustrated by a series of very fine illustrations, of which we would mention especially the view of Monastir from the air, and has three sketch-maps, a good index, and a list of references.

The contents consist of a summary account of Serbian history, including the recent campaigns. The author tells us that he has read the literature of his subject as widely as circumstances permitted, and supplemented his reading by conversations with Serbian officers and others well acquainted with Balkan conditions. The result is a concise and interesting volume which may be specially recommended to those whose acquaintance with Balkan history and conditions is still limited. Further, owing to its freshness, candour, and the number of first-hand observations, it should also be widely read by those to whom the story is already familiar.

The most interesting sections seem to us to be those which give the author's impressions of the Serbian people, and a few passages may be quoted from his description of the Serb as soldier:—"The army resembles a mediæval host, equipped with modern science and modern weapons. The mutual relations of soldier and officer resemble those of the clansman and his chief. There is no thought about equality or inequality. The officer is the leader, the more skilled warrior, whose life is precious and whose will is to be obeyed. The soldier is the follower, whose powers are all at the other's disposal without reserve and without complaint. But it is only so, I imagine, because the soldier's place in the national life is assured—he is an indispensable and free citizen in time of peace, taking his share in the government of the commune. . . . The personal touch, the underlying equality of men that characterised the Middle Ages, has not been destroyed by the impersonal conditions that followed industrialisation."

Mr. Laffan also contrasts the relation of officer and private in the Serbian army with that which exists in the British. In the latter it is assumed that the private must be watched over and guided by his officer, while among the Serbs the private, as being hardier and more accustomed to an open air life, considers it his part to watch over the health and well-being of his officer. Of this one amusing example is mentioned in the story of a wounded officer, in great pain, who was comforted by a private with the assurance that he would take as much

care of him as if he had been his own calf! Of the physique of these soldier peasants a wonderful account is given. In one case an English doctor, who had performed a somewhat severe internal operation upon a Serb, found his patient next morning walking up and down in the open enjoying a cigarette. One regiment also, on one occasion, marched 64 kilometres (40 miles) between midday and the next morning, and went into action at once afterwards.

Of the future of the Serbs Mr. Laffan is hopeful. "To extend to them our pity would be an insult." But they must have generous aid during the period of reconstruction, and the present book, by inspiring both admiration and sympathy, is well-fitted to ensure that help shall be freely given.

New Italy. By HELEN ZIMMERN and ANTONIO AGRESTI. London: Constable, 1918. *Price 6s. net.*

Now that Italy has won back "Italia Irredenta," and that her oppressors, the Empires of Germany and Austria-Hungary, have ceased to be, a book like this should have a joyful reception. It is evidently written by those who are not only thoroughly acquainted with Italy but also enthusiastic applauders of her recent policy. They point out peculiarities in Italian politics which must often render their probable results obscure to foreigners. Thus, Italian politicians are divided into Republicans, Socialists, Liberals, Radicals, Catholics, and Conservatives. "The terms 'Liberals and Conservatives' are, however, but seldom used, those composing these parties being split up into *groups* which take their names from their leaders; for instance, just before the Great War, the so-called *Giolittiani* (the followers of Signor Giolitti) formed a majority in the Italian Parliament," yet Giolitti was in favour of the neutrality of Italy. According to the authors, "the large majority of the Deputies have been far more anxious to keep in with their most influential electors than to study the real interest of the country for the people to have any great confidence in their Parliamentary representatives." As just mentioned, "when Italy joined the Allies (and declared war on Austria-Hungary on 23rd May 1915), she did so at the will of the people, in the face of a vacillating Government and a Parliament which was largely antagonistic. In May 1915 the German Peaceful Penetration of Italy was laid bare and stopped."

The New Italy would not be complete without Educational and Economical progress. In both departments great advances have been made. The wretched Italian schools of twenty years ago have given place to very different conditions. "The school buildings are now clean, well warmed, properly ventilated, and in every way suited to their purpose. The elementary school teachers, like their colleagues of the secondary schools, receive higher salaries and enjoy a very different position." In 1901-2 there were 53,259 elementary schools, attended by 184,766 children. In 1915 there were 74,192 elementary schools, and in 1907-8 486,275 children attending them. In 1915 their number must have exceeded half a million. The Technical Schools were attended by 88,896 scholars in 1910-11 and by 108,104 in 1913-14. There are also special schools of agriculture, mining, industry, and commerce, art, and music. Hand in hand with the spread of education in Italy has gone the industrial progress of the nation. The increased wealth of the country is proved by the very large increase in the value of its imports and exports. There is also an extensive annual emigration from Italy, rising from 625,637 in 1909 to 711,446 in 1912. This exodus has freed Italy "from the incubus of the superfluous workers whom she could not employ," while the remittances to Italy from her emigrant sons (exceeding six millions sterling annually) have done much to alleviate poverty.

ASIA.

Syria and the Holy Land. By the Very Rev. Sir George Adam Smith, M.A., D.D., Principal of Aberdeen University. London: Hodder and Stoughton, 1918. *Price* 1*s. net.*

This brief tractate of 56 pages, accompanied by two excellent maps, puts in compact form a mass of interesting and useful knowledge in regard to the Holy Land. Needless to say, the Principal is a master of his subject. He knows the land, its people, its long and chequered history, by frequent visits, careful investigation, and prolonged study. The features of the country are as familiar to him as the unique facts of its age-time story. Any one desiring first-hand acquaintance with a country so dear to the heart of Christendom, and passing through one of its momentous changes again at this hour, will welcome the brochure. The Principal acknowledges that the future of the region is a problem requiring careful consideration. There are "serious difficulties connected with the restoration of the Jew to Palestine which must be faced before the political future of that country and of those that have claims upon it is determined. It is not true that Palestine is the natural home of the Jewish people, and of no other people. There are native Christians, Syrian and Greek. They doubtless claim that their faith is the moral heir of all that was best in ancient Judaism." Then there are the living Christian communities. "Is not Palestine the birthplace of their faith also, and its fields as sacred to Christians as to Jews? Has Christianity made no history, and left no image of its spirit on the Holy Land?" It is apparent many things require to be thought out before the future of Syria can be settled on lines of justice and security for all nations and creeds alike.

AMERICA.

South America: an Industrial and Commercial Field. By W. H. Koebel. London: T. Fisher Unwin, Ltd. *Price* 18*s. net.*

South America and the War. By F. A. Kirkpatrick, M.A. Cambridge: At the University Press. *Price* 4*s.* 6*d. net.*

The resumption of trade and relations with the South American Republics which may be expected to follow after the war tend to make the appearance of books like the above especially opportune. They have no claim to any special geographical interest, except in so far as considerations of economic relations form an important branch of geography and are in their essence dependent upon a right study of the subject. Mr. Koebel is well known as a writer on South American questions (*cf.* his *Paraguay*, which was reviewed in the *Magazine* for April 1917, also *Central America*, reviewed in the number for April 1918). The present volume forms another of Mr. Fisher Unwin's South American series, and deals with the continent as an industrial and commercial field. It is impossible at this time to avoid making comparisons between the methods of Great Britain and of Germany, and the more so because the Germans have succeeded in ousting us from a good many markets, and in gaining for themselves a large share of the trade which we formerly regarded as our own. Mr. Koebel furnishes copious statistics of trade with the different republics, each one being dealt with separately and in detail, and it may be worth while mentioning here that the total trade of the United Kingdom with South America in 1914 consisted of imports valued at 52 millions sterling, and exports, 32 millions. Apart from this sea-borne trade, it is a matter of common knowledge that Great Britain has immense interests in railways, river-steamers, banking, insurance, etc., etc., the value of which has been

estimated at about 1000 millions sterling. All of these come under Mr. Koebel's survey, and the reader will find that he has a good deal to say about them which is interesting and attractive; but we would draw special attention to the chapter which treats of the occupations of the British in the past, and of the most suitable present-day occupations for those who meditate seeking their fortunes in the Latin republics of South America. We are sure that the latter will find many very useful hints for their guidance, while the general reader is provided with much practical information put in a very attractive shape. Illustrations, too, are good, and it may be a surprise to some to see depicted a good-sized railway train, with a British locomotive, amidst the Andean snows, at 15,865 feet above sea-level.

Mr. Kirkpatrick's book is small, but it is also very valuable and instructive. It contains the substance of a course of lectures given by the author at King's College, London, in the Lent Term of 1918; the object of the lecturer being, as he says in his prefatory note, to perform a war-service by drawing attention to the activity of the Germans in Latin America, and especially to the pertinacity which they have shown in an endeavour to hold their present ground during the war, so as to be in a good position to resume operations when it is over. Mr. Kirkpatrick points out that the beginnings of great economic movements in South America synchronised with the rise of the modern German Empire, and that Germany found in these countries a great opportunity for the development of her commerce. He does not neglect to do justice to the thrift and intelligence of the early German settlers who have done so much to develop the southern portion of Brazil. He says that their descendants are now estimated to number 400,000, "inhabiting German towns, with German schools, newspapers, and churches." These flourishing German colonies constitute an *imperium in imperio*, or, to use the German phrase, a *Deutschtum im Ausland*, in which the idea has been assiduously cultivated, by means of imperial grants made to the schools, that the pupils owe a prior allegiance to the Fatherland. This may be legitimate enough, but there are more questionable instances of German propaganda quoted in the chapter entitled "The German Outlook in Latin America." The German habit of fishing in troubled waters is shown by their attempt to revive during the war, by means of their propaganda, the bitterness of feeling which arose out of the dispute concerning the boundary between Venezuela and British Guiana; and even more in the effort of the German Foreign Office to bring about an alliance of Japan and Mexico against the United States. The Briton in South America is often accused of a lack of cordiality in his dealings with the people, and in this respect his demeanour is compared, to his disadvantage, with the more cordial attitude of the Frenchman; but the former retains a reputation throughout the republics for good work and integrity, and *Palabra de Inglés* remains a proverb to this day throughout Spanish America.

GENERAL.

The Desert Campaigns. By W. T. Massey. With Illustrations by James M'Bey. London: Constable and Company, 1918. *Price 6s. net.*

In this world-wide war it is almost impossible to keep in touch with all parts of the far-flung battle-line. Great and heroic work is being done at the outposts, which is apt to be overlooked and forgotten by the absorbing events in the main centres. We are grateful to Mr. Massey for taking the hint of a friend, who hoped the war in Egypt would soon be over, and that the boys would come to France and see really what war is! As if they did not know it in their fierce desert campaigns! They had not only to fight a cunning, vigilant, determined

enemy, but also with thirst, mosquitoes, the absence of roads, pitiless suns, and endless sand-storms. No one who reads Mr. Massey's plain, unvarnished tale of what our forces have done in Egypt, striking out towards the East, till they reached the gates of the Holy Land, and toward the West, till they swept the troublesome, terrorising Senussi out of their wide domain, but will acknowledge the endurance and devotion of the men gathered from all parts of the Empire, and the remarkable foresight and skill of their officers. Mr. Massey carries his story only to the edge of Gaza; and we hope some day soon he will complete his narrative, and relate the capture of Palestine. The book is furnished with an excellent map and a number of illustrations.

Our Allies and Enemies in the Near East. By Jean Victor Bates. With an Introduction by the Right Hon. Sir Edward Carson, K.C., M.P. London: Chapman and Hall, Ltd., 1918.

Clear, vivid pictures of a welter of peoples and creeds are the distinguishing features of this book. Miss Bates begins with a voyage down the Danube from the Iron Gates to the Black Sea, then turns aside into Rumanian lands, crosses the river into Bulgaria, and closes among Jews in Croatia. We meet Romans and Gypsies, Saxons and Magyars, Serbs, Turks, and Bulgars, Vlachs and Ruthenians, and even these do not exhaust the list. At one time we are in a fashionable hotel in Bucharest, which might be in Paris, at another in a Bulgarian village inn, surrounded by acres of roses. We have lunch in a first-class restaurant, and supper in a back street eating-house, where the fragrant fumes of coffee and the noisome odours of garlic and humanity fight for the mastery. Of portraits there is a large gallery. Ferdinand the Fox is drawn with a merciless pen. He stands revealed as an almost incredible, non-human creature, whose character is wholly made up of vices, all of them mean, petty, cowardly, and contemptible. Miss Bates's black is real and solid with sharp edges. There is no shading off into greys which look almost white in some lights. And that is the only approach to unfavourable criticism we feel inclined to offer, and even that with hesitation. The letter from her old pupil which ends the book, a letter written from hospital, with its tale of confiscation and murder, of calculated Austrian cruelty, provides ample evidence for the author's terrible indictment.

BOOKS RECEIVED.

Petrograd (The City of Trouble), 1914-1918. By Meriel Buchanan. Crown 8vo. Pp. 262. London: Collins, Sons and Co., 1918. *Price 7s. 6d. net.*

Through Egypt in War Time. By Martin S. Briggs. With Illustrations. Small royal 8vo. Pp. 280. London: T. Fisher Unwin, 1919. *Price 21s. net.*

The Turkish Problem. By Count Léon Ostrorog. Translated by Winifred Stephens. With Map. Crown 8vo. Pp. xix + 206. London: Chatto and Windus, 1919. *Price 6s. net.*

Togoland. By Albert F. Calvert. With Illustrations and Map. Crown 8vo. Pp. xxxi + 160. London: T. Werner Laurie, 1918. *Price 5s. net.*

Japan Day by Day. 1877, 1878-79, 1882-83. By Edward S. Morse, formerly Professor in the Imperial University of Tokyo. With 777 Illustrations from Sketches in the Author's Journal. Two volumes. Medium 8vo. Pp. vol. i., xvi + 440; vol. ii., 453. Boston and New York: Houghton Mifflin Company, 1917. London: A. Constable and Co.

The Pictish Nation: its People and its Church. By Archibald R. Scott,

B.D., author of *St. Ninian, Apostle to the Britons and Picts.* Royal 8vo. Pp. xxiv + 561. Edinburgh: T. N. Foulis, 1918. *Price* 25*s. net.*

The Destinies of the Stars. By SVANTÉ ARRHENIUS, President, Noble Institute, Stockholm, Sweden (recipient of the Nobel Prize in Chemistry, 1903). Authorised translation from the Swedish by J. E. FRIES, Fellow A.I.E.E. With 28 Illustrations and 2 Maps. Crown 8vo. Pp. xviii + 256. London: G. P. Putnam's Sons, 1918. *Price* 7*s.* 6*d. net.*

Germany, 1815-1890. By Sir A. W. WARD, Litt.D., F.R.A. In 3 volumes. Vols. i. and iii. Crown 8vo. Pp., vol. i., xiv + 591; vol. iii., xvi + 437. Cambridge Historical Series. London: Cambridge University Press, 1918. *Price* 12*s.* 6*d. net.* each volume.

The Cradle of the War. The Near East and Pan-Germanism. By H. CHARLES WOODS, F.R.G.S. With Maps and Illustrations. Demy 8vo. Pp. xi + 360. London: John Murray, 1918. *Price* 12*s. net.*

Cities and Sea Coasts and Islands. By ARTHUR SYMONS. Crown 8vo. Pp. 353. London: Collins, Sons and Co., 1918. *Price* 7*s.* 6*d. net.*

Le Nouveau Japon. By ANDRÉ BELLESSORT. Crown 8vo. Pp. 312. Paris: Perrin et Cie., 1918. *Price* 4 *fr.*

Milestones on my Long Journey: Memoirs of a Colonial Governor. By Sir CHARLES BRUCE, G.C.M.G. Third Edition, revised and extended. Crown 8vo. Pp. 202. Glasgow: James MacLehose and Sons, 1919. *Price* 2*s. net.*

[*Presented by the Author.*

A Burmese Loneliness: A Tale of Travel in Burma, the Southern Shan States and Keng Tung. By Capt. C. M. ENRIQUÉZ, F.R.G.S. With Maps and Illustrations. Crown 8vo. Pp. xv + 283. Calcutta: Thacker, Spink and Co., 1919.

A Broken Journey: Wanderings from the Hoangho to the Island of Saghalien and the Upper Reaches of the Amur River. With 61 Illustrations from Photographs by the Author. Medium 8vo. Pp. xii + 295. London: T. Werner Laurie, Ltd., 1919. *Price* 18*s. net.*

Account of a Journey down the Magdalena River through the Magdalena Province and the Peninsula of Goarjira (Colombia). By M. T. DAWE, F.L.S. Imp. 8vo. Pp. 32. Bogota: Ministry of Agriculture and Commerce, 1918.

[*Presented by the Director, Royal Botanic Gardens, Kew.*

Les Frontières Historiques de la Serbie. Par GASTON GRAVIER. Avec 3 cartes dans le texte et 3 cartes hors texte. Crown 8vo. Pp. 164. Paris: Librairie Armand Colin, 1918. *Prix* 4 *fr.*

Jack London and Hawaii. By Mrs. JACK LONDON. Crown 8vo. Pp. x + 305. London: Mills and Boon, Ltd., 1919. *Price* 8*s.* 6*d. net.*

Hydrographie Souterraine et Évolution Morphologique du Karst. Par J. CVIJIĆ, Professeur à l'Université de Belgrade. Demy 8vo. Pp. 56. Grenoble, 1918. [*Presented by the Author.*

Report on Rainfall Registration in Mysore for 1917. Bangalore, 1918.

Report of the Director of the National Park Service to the Secretary of the Interior for the Year ended June 30, 1918. Washington, 1918.

Town Planning towards City Development. A Report to the Durbar of Indore. By PATRICK GEDDES. Two volumes. Indore, 1918.

Calendario Atlante di Agostini 1919. Anno xvi. Pp. 191. Istituto Geografica di Agostini. Novara, 1919.

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE HISTORY OF THE NEW ZEALAND FIORDLAND, WITH A REFERENCE TO THE HISTORY AND DEVELOPMENT OF THE DOMINION.[1]

By the Hon. Sir Thomas Mackenzie, K.C.M.G.,
High Commissioner for New Zealand.

(With Illustrations.)

May I, at the outset, strike a personal note? My father left Scotland with his young family in 1857, and landed in New Zealand within nine years of the foundation of the settlement of the Province of Otago. I have therefore seen the development of the country from its earliest days, and have been associated with much of its life and history; my experiences, which have been full of variety and interest, ranging from the occupation of a fern-tree hut in the primeval forest to the present day.

The Hon. W. P. Reeves, one of my predecessors in office, writing of New Zealand, states: "From the day of its annexation, so disliked by Downing Street, to the passing of those experimental laws, so frowned upon by orthodox economists, our colony has contrived to attract interest and cause controversy."

Geologists tell us that New Zealand is one of the oldest countries on the globe. There is no doubt that it was at one time connected with the Antarctic, with South America, and probably, more recently, with some of the islands lying to the south, east, and north-east of the mainland. Plant life in some respects corresponds with that of South America; indeed some of the species are found nowhere but in South America and New Zealand. On the adjacent islands to which I have

[1] The opening Lecture for the Session 1918-19, delivered before the Society in Edinburgh, on November 14, 1918.

alluded, plant and animal life correspond, with certain variations, with that of the mainland. A great variety seems to exist as regards the stratigraphical geology of New Zealand. Schists, sandstone, and shales are the principal mountain rocks of the country. The oldest rocks are found in the south-west of the South Island and in Stewart Island; they are gneisses. There are three classes of lakes, those of the glaciated district, of the volcanic country, and the lagoons near the sea-coast.

New Zealand, which has an area of about 106,000 square miles, rather less than the area of the United Kingdom, is situated between 34° and 48° south latitude and 166° and 179° east longitude. The climate is temperate, and the rainfall over the greater part of the country fairly uniform, except over a small portion of Otago, where it averages only 15 to 20 inches per annum; on the western coast, however, it rises in some parts to 200 inches. The mean annual temperature in Auckland averages 59°, in Wellington, the centre of the Islands, 55°, and in Otago 50°. Napier is said to have an average daily sunshine record throughout the year of eight hours.

A great mountain range traverses the whole of the South Island; indeed it might be said to be continuous from the East Cape in the North Island to the West Cape in the South Island, with the exception of a break at Cook's Strait. From this snow-capped mountain range is derived the name given by the Maoris to the country—Ao-tea-roa, which means "The Long White Cloud."

So far as we can gather, the Maoris were the first inhabitants, and a word or two might be said on the history of this race. The opinion is held that the Maoris are descendants of Aryan and Mongolian peoples, with a strong strain of the Caucasian. We are fairly satisfied that they originally came from the uplands of Asia, and that they were driven out by Aryan races about 1000 years before Christ. They became great navigators, explored a vast part of the Pacific, many of the islands of which they peopled. But the most authentic record we have is of their arrival in New Zealand about 1350, although a great navigator named Kupu is said to have discovered the country in the fourth century. They are a strong, vigorous, intellectual race, and proved worthy foes in the wars that raged during the early days of the white settlement. They lived under a treaty made with the colonists (the Treaty of Waitangi), which preserved to them certain lands, fishing rights, game shooting rights, etc. The original treaty has since been modified, but in the main its terms have been observed. The Maoris sit in our Parliament, have held, frequently with great credit, ministerial rank, and, as we know, they are fighting with us in the present war, and have worthily maintained their traditions.

New Zealand was discovered by Tasman in the year 1642, although the French claim that the islands were visited at an earlier period, namely in 1504. This claim is, however, not supported by sufficient evidence to warrant our accepting it without question. Captain Cook followed about a century and a quarter later, in 1769, and from that time may be dated the history of our country, although it was not until nearly three-quarters of a century later that real colonisation began.

New Zealand is the most British of the Overseas Dominions. Its population is slightly more than 1,000,000, and 98 per cent. of the people are British born or of British descent.

The only indigenous quadruped in the islands is a small, harmless rat, but the deficiency in mammals is made up by the great variety of birds. Indeed it has been said that from an ornithological point of view New Zealand is the most interesting country in the world. A very large bird called the Moa at one time inhabited the country. The Kiwi (*Apteryx*) is a living representative of the species on a small scale. The Moa was first brought to the notice of the British public through Professor Owen receiving a thigh bone, which he declared to have belonged to a gigantic bird, some representatives of which must have attained a height of 14 feet. Controversy arose as to whether the Moa and man were contemporary; but we have on that point definite information of an affirmative character gathered from the Maori stories and legends associated with these birds. In my own explorations in the Tautuku forests I found in Maori middens bones of the Moa and Kiwi, as well as other bones, all mixed together, those of the Moa having been broken for the marrow; and I also found Maori implements made in whole or part from Moa bones. In addition to the Kiwi we have many flightless birds, such as the Kakapo (*Stringops habroptilus*), and in some of the islands there are flightless ducks. A very rare bird called the Takahe (*Notornis mantelli*), which is a large rail, is said to exist, but I believe only three specimens have been found. The Kea (*Nestor notabilis*) is a bird requiring passing notice, as showing that new opportunities develop new characteristics. This bird formerly lived on insects and berries, but after the introduction of sheep into New Zealand it developed the habit of attacking the animals for their fat, especially that in the region of the kidneys. Our "creeping things of the earth" consist almost entirely of lizards, there being absolutely no snakes in the country. Even lizards are represented by only fifteen species. But among the reptiles is the famous tuatara. It is not a true lizard, as in structure it shows an affinity to the crocodile, and its ribs have bird-like characteristics. It stands apart from all the rest of its class, and if ancient lineage, combined with unchanged habits, mark the aristocrat, it is the most aristocratic animal in the world.

New Zealand has large and valuable forests. The finest of all our trees is called the Kauri (*Agathis australis*), which grows to an immense size, the largest specimens reaching a circumference of 66 feet, with a clear trunk running up sometimes as high as 150 feet, without a branch. The gum that is found exuding from the trees in old Kauri forests, and which is dug from the earth in open country formerly covered by Kauri forests, is valuable.

The country has many minerals and much mineral wealth, but, with the exception of gold, they are largely undeveloped. The total exportation of gold from New Zealand from 1853, when mining operations commenced, until quite recently, is valued at £86,751,563. We have extensive coal-fields, which it is computed contain 520,000,000 tons, but our water power will in future probably be of more import-

ance to us than coal. Iron is found in parts in close proximity to the coal deposits, but except in Taranaki no development has taken place in mining this mineral. New Zealand is undoubtedly destined to become a great manufacturing country by reason of its great water power and of the abundance of its raw materials, and of the great quantities of food which can be grown there. Our chief industries in the future will probably be the manufacture of woollen goods, the working of iron, and the raising of agricultural products. These last have already, by reason of the excellence of their quality, taken a leading place in the world's markets. During the war they have been exclusively reserved for the British people, and before the cessation of hostilities probably £100,000,000 worth will have been supplied to the Home Government. I would here parenthetically remark that we have sent more than 100,000 men to fight for the Empire—that is, three times the number of British who fought at the battle of Waterloo. And the expenditure we have incurred and will incur in connection with the war will probably reach £100,000,000. We have lost by death 15,000 of our soldiers, and that is the heaviest of all the losses our country has been called upon to bear. But our men have, I believe, nobly borne their part, and, whilst the loss of our loved ones is deeply mourned, their work, together with the work of others, will, we feel sure, have enduring results.

Sawing a Kauri Tree.

New Zealand may be said to be a pocket edition of many portions of the globe. In our thermal districts of the North Island we have the wonders of the Yellowstone Park of America; in our burning mountain we have the volcanoes of Italy; in the long range of mountains traversing the South Island we have the Alps of Switzerland. The highest point of that range is Mount Cook (12,346 ft.), or in the native language Aorangi, which means "The Sky Piercer." Its summit was reached by Messrs. Fyfe, Graham, and Clarke in 1894, although previous unsuccessful attempts had been made in 1882 by the Rev. W. S. Green and others, and in 1890 by Messrs. Mannering and Dixon. Huge glaciers descend the eastern and western slopes of this range, the largest being the Tasman Glacier, some eighteen miles in length, and with a varying width of from one to two miles. It has many laterals and magnificent icefalls, the greatest being the Hochstetter, which comes

from the summit of Mount Cook. Farther to the south-west are the fiords, resembling those of Norway, the coast being exceedingly abrupt on the western side. The sounds are very deep, reaching a depth of 1750 ft. or more, and are twelve or thirteen in number. The most northern of them is named Milford Sound, and it is regarded by some as the finest of them all, although, in my opinion, there are others which vie with it in grandeur. A professor of Harvard states that it seems possible that Milford Sound possesses elements which at some future time might bring it to be regarded as one of the world's great scenic types. The Sound is a product of glaciers. The great cliffs, which lend so

Milford Sound from Windbound Point.

weird a picturesqueness to the *ensemble*, are like the channels that are being cut to-day by the great glaciers of the Southern Alps.

I propose next to say something of my explorations in the New Zealand Fiordland. Milford Sound is situated on a portion of the west coast with which the Provincial Government of Otago had always been desirous of opening up communication. Prior to 1888 various attempts were made, but they were unsuccessful. About 1860 Mr. James M'Kerrow, F.R.S., who had accomplished most important reconnaissance work in the interior of Otago, reached the mountains overlooking the western coast, one of which he called Mount Pisgah, and he supplied valuable records of his work. In 1887 Quinton M'Kinnon and a companion named Tucker crossed from the north fiord of Lake Te Anau to the west, the first occasion upon which any one had reached the Western Fiords overland. Milford Sound, however, was still the great desidera-

tum; and later in 1887 Quinton M'Kinnon set out to endeavour to find a pass leading to that fiord. He returned after suffering great hardships, and supplied a rough map up to the point which he had reached in his explorations, and from which he hoped finally to cross to the west. In 1888 the Chief Surveyor of Otago organised a strong party to go round the west coast by steamer and to explore the locality. His work was to include the measuring of a high waterfall. He asked me to join his party, which I was very pleased to do, as I had long desired to try to find a pass over the mountains from the west to the east. I immediately accepted his invitation, and was the more pleased to do so as my old travelling companion, W. S. Pillans, agreed to accompany me. I told the Chief Surveyor of my plans, stipulating for an extra man, as a party of three was the least in number that could safely undertake the important work required of it, which involved exploring from the western coast and endeavouring to cross to the interior. He agreed, adding that he himself proposed to get overland if possible. At the same time we were to endeavour to find M'Kinnon, who had been out for a considerable time, some anxiety being felt regarding his safety. We arrived at Milford Sound in October that year, and the headquarters' camp was fixed there. After waiting a day or two I decided to proceed inland with a small party as a preliminary to attacking the heavier work. We carried with us a small canvas boat. With difficulty we crossed a lake, which was really a submerged forest. Two rivers came in from the head of the lake, one from the east and the other from the south, the latter being the larger. This we followed for seven or eight miles until we reached a high waterfall, named the Sutherland Fall, which the Chief Surveyor subsequently measured and found to be 1904 feet high. This waterfall had been the subject of considerable discussion, and some people had asserted that its height was 5000 feet. Here we found Sutherland, after whom the waterfall was named, and his companion, and they were astonished to see us. I may mention that Sutherland has accomplished a good deal of pioneer work in the valleys falling down to Milford Sound. The shape of the country towards the east indicated the possibility of being able to cross over the mountain range. We therefore returned to the Sound with a view to obtaining proper equipment, to reporting the situation to the Chief Surveyor, and to making known to him our decision to attempt to effect a crossing from the point near the waterfall. He however thought, judging from M'Kinnon's rough sketch, that it was improbable we should find a pass there, or come across M'Kinnon, whose sketch seemed to indicate that he would be farther to the north-east. But the Chief Surveyor said he would give me a third companion in order that we might follow up the river coming into the lake from the east. We agreed to carry out his proposal, and followed the river up a considerable distance, when our third companion objected to going farther on the score of danger. We were greatly disappointed, as we saw ahead what I thought to be a negotiable pass. We were in a wild and inhospitable region, it was impossible to separate as a party, for, having only one tent, we had either to proceed with that tent and leave the third man

without one, or to give him the tent and go without ourselves. We therefore had reluctantly to return. But I made data of the surroundings, and the pass has since been traversed by, I think, Mr. Park of the Geological Department. We returned to the Sound. The Chief Surveyor was still of opinion that the route we had originally selected ought not to be followed. He gave us another man, and we took a fresh route, which however eventually proved to be quite inaccessible at that time of the year owing to avalanches and snowslips. Time was passing; the steamer was expected to call at Milford in order to take the Chief Surveyor and his party back to Dunedin; but our own little party were resolved to find, if possible, a way over the mountains, so we returned to the spot we had originally selected, east of the falls, determined to try our luck there. We set out, and to our great delight found stuck in a tree in the forest a small piece of paper bearing the signature of Quinton M'Kinnon. Our joy was great. We knew M'Kinnon could not go beyond a certain distance without the aid of a boat; we therefore proceeded down the river, and at nightfall we found him. He thought it advisable to report to the Chief Surveyor, and, having done so, joined forces with Pillans and myself, and we proceeded overland. Unfortunately we experienced great difficulty in finding the pass again, and it was not until I had climbed the mountain on which was a glacier, which I named after our then Governor, Sir William Jervois, that I was able to make an observation which enabled us to reach the summit early next morning, when we pursued our course. It was our great desire to reach civilisation if possible before the steamer carrying the Chief Surveyor touched a point from which he could telegraph the news of the whereabouts of his party, and we succeeded in doing this.

Sutherland Fall, Milford Sound. The fall (1904 ft.) is the highest in the Southern Hemisphere.

I have spoken at some length on the work of M'Kinnon, because I gather that an attempt has been made by some one to rob him of the honour that attaches to his name, of having been the first to cross that range of mountains. A few years later poor M'Kinnon was lost, and I had charge of the relief expedition which was organised to endeavour to find him. Although we never found his body, yet we were able to furnish a full account of the manner in which he met his death.

The history of the exploration of the country around Milford would

be incomplete were I not to refer to another attempt made to reach the Sound from a river called the Holyford, which traverses a valley immediately behind the great beetling cliffs that guard the north-eastern side of the Sound. I ought to explain that whilst the route discovered *via* Lake Te Anau was of great value, it was very much desired that Milford should be reached from the valley of the Holyford River, which falls into Martin's Bay. Insuperable difficulties presented themselves, but it was felt that an attempt ought to be made, for were this route found possible, it would connect with Lake Wakitipu *via* the Greenstone Valley, and then a connection would be established with the interior of Otago, its roads and its railways. In January 1891 a young surveyor called William Quill attempted to cross alone by a saddle named Homer's Saddle from the Holyford Valley. He ventured too near the edge of the cliff, his foot slipped, and he fell over the precipice, which is some 2000 feet high. All that was ever found of him, after a patient search of forty-two days by his brothers, was a small piece of his jaw. It was he who climbed the face of the Sutherland Falls, and discovered the lake from which the falls issue, and which now bears his name. The following is his last written communication: "Gone to Lake Gertrude Saddle, am trying to get down to Cleddau Valley. Will Quill, 15 1 91, 7 A.M." Quill failed, but the feat has since been accomplished. I am not sure of the date, but I should say about the year 1906, a party which had done a great deal of exploration in the neighbourhood of the Sounds, with valuable results, finally succeeded in getting over. I can remember the names of only two of the party, Messrs. Graves and Lee, but I think there was a third. I have telegraphed to New Zealand for information, but have not yet received a reply, and I am unable to find a record of their work. However, they succeeded in crossing, and it was a bold and adventurous undertaking. It is possible that a track can be cut in the rock, but until this is done this route is of no use. The mountains are high and abrupt here, and a very short tunnel of some 1200 yards pierced through them would connect the interior of Otago with Milford Sound.

I have now come to the end of my information regarding the explorations in the neighbourhood of Milford Sound, and I will now speak of other undertakings for connecting the Western Fiords with the interior of the country. After our return from Milford in 1888, a Professor of the Otago University, called Mannering Brown, met me one day and told me that he intended once more to attempt to cross from the south-west branch of Lake Manapouri to Hall's Arm. I strongly advised him not to venture that season, for it was an exceedingly bad one; in the spring there had been heavy falls of snow and sudden meltings, and the dangers to be encountered from avalanches and landslips would no doubt be great. He replied that, as we had succeeded in getting through from Milford (a more difficult country), surely he would succeed in his attempt. We then parted, and the next I heard of the Professor was when sitting one evening in the theatre. Mr. Malcolm Ross, who is now war correspondent in France with the New Zealand Forces, entered, and touching me on the shoulder, said, "Mannering Brown is

lost, and we want you to lead an expedition for the purpose of finding him, if that be possible." Two members of the explorer's party, Major Goring and Mr. John White, had made a long and trying search before leaving the locality. Mr. White had suffered very much in consequence, so that Major Goring and he had to return. The relief party was organised, and we set out. We had great difficulty in even finding the part of the country where Brown had been lost, but we eventually discovered the spot, and although we searched thoroughly we could find no trace of the missing man, and so we pursued the work which he would have carried out had he been spared, and finally reached the place, immediately above the fiord, which was to have been the goal of his journey. Hall's Arm was below us some three miles away. We did not descend, as our object was to search for the missing man, but we named a mountain and a lake after him, Lake Mannering and Mount Mannering. Some years later a surveyor, when making a more complete survey of the country, discovered a much lower pass which led to the Sound (Hall's Arm). We had skirted that part of the country, but never for a moment thought that a pass so easily negotiated existed. I named the river flowing through it the Dashwood, after a friend of my companion Pillans.

Another connection with the Western Fiords was discovered in 1894 by a party consisting of Mr. Pillans, Mr. Robert Murrell, the Honourable Mr. Earnshaw, and myself. We started from the south-west branch of Lake Manapouri with the intention of connecting with Dusky Sound. Dusky Sound is the most historic of all our Western Fiords. It was there upon two occasions that Captain Cook established his headquarters, and accomplished valuable work, records of which appear in his journals. It was at Dusky Sound that New Zealand's first shipbuilding took place. Dusky Sound was the resort of whalers and sealers in early days, and with it is connected a most interesting account of a ship named the *Endeavour*, the remains of which were found in a small bay called Facile Harbour. It appears that the vessel had left New South Wales late in the eighteenth century with a number of escaped convicts and time-expired men on board. Disputes arose on the voyage; the ship was taken into Dusky Sound and scuttled, the men intending, no doubt, to remain in New Zealand, but, owing to our impenetrable forests and to the barrier formed by the great mountain range, they did not succeed in reaching the interior, and ultimately had to fit out craft in which they returned, some to Norfolk Island, and others to New South Wales.

During this last exploration our party discovered three passes which were named Murrell, Pillans, and Mackenzie. In 1896 I connected from the west with the work done in 1894. This completes my knowledge of the discovery of the chief connections with the Western Fiordland of New Zealand. Others have done good work, but I am sorry to say I have no record of it.

A NEW RUSSIAN EXPEDITION TO NORTH SIBERIA.

By General J. DE SCHOKALSKY.

IN this *Magazine*, vol. xxx. p. 87, we published an article by General Schokalsky on Commander Vilkitsky's hydrographical expedition to the North Polar Ocean, which resulted in the discovery of Emperor Nicholas II. Land. We have recently received from General Schokalsky two communications, one a short account of a new expedition to the coast of Siberia, planned to start during last summer, and the other a letter giving some details in regard to the work of the Russian Geographical Society during the present troublous period. The first communication, whose contents are given below, does not make it perfectly clear whether the expedition did actually start during the summer of 1918, or whether it was only planned. Since, however, it is stated that the ships intended for the use of the expedition were lying ready at Archangel, it is possible that the author himself is uncertain on the subject. Under present conditions, communication between Archangel and Petrograd cannot be easy, and even the planning of the expedition, the provision of the necessary funds, of the ships, and of the personnel represent a very notable feat of organisation.

The plans of the new hydrographical and geographical expedition to the shores of North Siberia have been made by the General Hydrographical Administration of the Russian Navy, Mr. E. L. Bialokos, naval and hydrographical officer, having been responsible for their inception. The present expedition is a continuation of the work done by the Russian Admiralty in 1894-1904, when the western section of North Siberia was studied, and of Commander Vilkitsky's work between 1909 and 1915, when the eastern region was studied.

The new expedition is divided into two sections, an eastern and a western. To the eastern section is confided the area from East Cape to Cape Chelyuskin, and to the western that from the latter cape to the White Sea. Commander Vilkitsky is to be in command of the western party, and Commander Novopashenny, who was captain of the second ship in the last expedition in 1912-15, of the eastern section.

The programme of work laid down includes a survey of the shore in the two areas, hydrographical soundings both along the coast and in the estuaries of the chief rivers, and the careful study of the condition of the ice, not only during the period of free navigation, but throughout the year. Further, these ice observations are to be continued for five years, in order to form a basis for definite conclusions.

In addition, oceanographical and meteorological observations are to be carried on, not only during the period of navigation, but during the whole year. For this purpose both sections of the expedition will be provided with ships specially fitted for ice-work. [These ships were, as stated above, ready at the period when General Schokalsky wrote his note, but both this note and the letter are undated.]

In addition to the work outlined above the two sections of the expedition intend to set up on the coast of North Siberia new hydrometeorological stations, fitted with wireless telegraphy. These will be connected by other wireless stations with the regular Siberian telegraph offices. It is believed that in this way the possibility of accurate weather prediction for the whole country will be greatly increased. The study of the ice conditions is to be carried out from these shore stations, as well as from the special ships during their period of free navigation, which will be carried on at the margin of the ice. If possible, aeroplanes will also be used in studying the ice.

At present wireless stations are established on Yugor Strait, Kara Strait, at Cape Matte-sale, on the west coast of the Yalmal Peninsula, and at Dickson Harbour. During the present year it is proposed that to these shall be added the following new stations: one on the east entrance of the Matoshkin Strait, one at the mouth of the Yenisei, one at Obdorsk, on the Obi, and one at the mouth of the Petchora. In the following year (1920), to these will be added further, one in Nakhodka Inlet, one in the Gulf of Obi, one on White Island, one at the north of Yalmal Peninsula, one in the north of Novaya Zemlya at Cape Desire, and one in the Nordenskiöld Islands, near the shore between Dickson Harbour and the Taimir Peninsula.

In the same way new stations will be established to the east of the Taimir Peninsula as follows: In 1919 one on Koliutshin Island, in the bay of the same name, and one at the mouth of the Lena. In 1920 these will be supplemented by others, one on the island of Aion, one on Bear Island, one at the mouth of the Kolima River, and one on the island of Liakof. Other stations will be established in the interior of the country to connect the coastal stations with the telegraph offices of Siberia.

The stations are to remain open during the whole year, in order that the staff may make observations both of the ice conditions and of the life of the surrounding country throughout the seasons. Experts will also be attached to the expedition to study the economic conditions and the possibilities of trade.

General Schokalsky has been appointed editor both of the material collected by Commander Vilkitsky during the years 1911-15, and also of that which is to be collected by the new expedition.

In his letter General Schokalsky gives a terrible, though restrained, picture of the social and economic conditions in Russia at the present time, and of his personal difficulties in carrying on the work of the Russian Geographical Society, and protecting its collections and constitution from anarchical attacks. As to the general conditions of the country, he states that these vary very greatly, even within short distances, from one place to another. In some areas destruction is widespread, and there is no security, while elsewhere the relations between the different sections of the community are fairly good, and property is more or less intact. He gives it as his opinion that Russia is on the verge of another change, and that the worst is now over.

His personal work for the Geographical Society has been crowned with a considerable measure of success, and, indeed, the detailed programme of projected investigations, which we have given above, shows that a nucleus of ardent scientists must still remain in the midst of the revolution. A new secretary has been appointed to the Society in the person of Mr. W. L. Komarof, the Vice-Director of the Botanical Garden at Petrograd, and a botanist and traveller in Siberia and Kamchatka, and attempts to alter the by-laws, the constitution, and the character of the Society have been frustrated.

THE TURKISH PROBLEM.[1]

THE two books named below, though differing in subject matter no less than in style and treatment, both deal, directly or indirectly, with questions raised by the break-up of the Turkish Empire, and may therefore be conveniently considered together.

The Turkish problem, as defined by Count Ostrorog, is how to establish some settled political order among the medley of creeds and races called Turkey; how to deliver the subjects of Turkey—Greeks, Armenians, Arabs, and Turkish peasantry—from cruel and chronic oppression; how to effect a natural partition of Turkey; and, Turkey partitioned, whom to put in charge of the great crossing of highways at Constantinople, whom to make "Le Sublime Portier" in the place of "La Sublime Porte." According to Count Léon Ostrorog, the Turkish rulers are utterly incompetent as organisers, administrators, and statesmen, or, if competent, lack the energy and steady driving power requisite for success. He might have added that in these days, when wars are not won by single battles, but involve prolonged organisation, the Turks are likewise utterly incompetent as military leaders. Going deeper, he might still further have expounded how individuality and will-power in all these spheres are necessarily paralysed by Turkish fatalism. The natural rôle of the Turk is to be a submissive peasant or, in battle, a fierce, if not a staying, fighter. The author gives the Turks a certain amount of credit for the employment of eminent foreigners, French and British, to make good their own deficiencies as heads of departments. Neither will he allow that the "Young Turk" leaders were in the pay of the German Government. They were fooled by Germany into cherishing the dream of a great Ottoman Empire, to be won as Germany's allies.

The Turkish problem now awaits solution in the councils of the Peace Conference at Paris, Turkey having surrendered to the Allied Powers, as was announced on 1st November 1918. In the autumn of 1914 Turkey was offered by the Allies a guarantee of the integrity of

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[1] (1) *The Turkish Problem.* By Count Léon Ostrorog. Translated from the French by Winifred Stephens. With a Map. London: Chatto and Windus, 1919. Price 6s. net.

(2) *The Turks of Central Asia in History and at the Present Day.* By M. A. Czaplicka. Oxford: Clarendon Press. Price 15s. net.

her empire, but she chose instead, or Enver Pasha chose for her, to link her fate with Germany by entering the Great War as Germany's ally on 29th October 1914. With the victory of the Allies, a radical solution of the Turkish problem in Europe and Asia has become possible for the first time.

For the understanding of the problem the facts set forth in this book are still relevant, although the problem wears a very different aspect now from what it did when the original French version of the book was written at the beginning of 1916. Outstanding evidence of the changed political situation is seen in the chapters which argue in favour of Russian guardianship or possession of the Dardanelles and Bosphorus. The internationalisation of Constantinople under the ægis of the United States had not risen above the writer's horizon when the body of the book was written.

The volume, as originally conceived, was designed exclusively for the French general public: it opens with the words, "What Frenchman never having left France—the most homogeneous country in the world—could form a correct conception of Turkey!" In chapter xviii., again, the French claim to Syria and Palestine is stated with French lucidity: the thought of annexation is set aside because annexation would antagonise the native Syrians, but the prescriptive right of France to guardianship is as explicitly asserted—a subordinate Arab or Turkish dynasty being enthroned at Damascus. One reads the French views of things with special interest, believing that agreement between France and Britain on such questions is of more value for the future peace of the world than any abstract Utopian resolutions relative to a World League of Nations. The French standpoint is perhaps the most interesting feature of the book.

A striking contention of this most readable and informative volume may be noted, viz., the position taken up by the author that the blocking of the Dardanelles to grain export from South Russia, when Turkey entered into the war, was a main cause of the Russian Revolution. The Russian grain-growing population lost their market, Russia was starved financially and in respect of munitions, and the collapse followed.

The volume has neither table of contents nor index nor headings of chapters, but contains a map which shows the latest stage of railway development in the Turkish Asiatic Empire.

As contrasted with Count Ostrorog's, Miss Czaplicka's book is not war literature, although the book does possess an intimate connection with the Great War of the past four and a half years. The "Young Turks" of the twentieth century, gulled by Germans with ulterior motives into cherishing dreams of a Pan-Islamic Empire—a Middle Asia balancing a Mittel-Europa—accepted along with the political delusion a linguistic and ethnological fancy of a common origin of the peoples, loosely designated Turkish or Turanian. The Pan-Islamic dream was to be buttressed and fostered by the Pan-Turanian myth. The object of the book is to show the unscientific character of the high-sounding term "Pan-Turanian." "To wish for conquest and expansion is one thing; to claim a land on grounds of ethnical and traditional continuity is quite

another. . . . To speak of the Osmanlis and the Turanian Turks as a racial and cultural unity would be by a stroke of the pen, or by means of a propagandist pamphlet, to wipe away all the invasions, migrations, massacres, and fusions which for twenty centuries have played havoc with that part of the world."

Miss Czaplicka's carefully elaborated volume may be summed up as follows: There are peoples extending from Constantinople to Mongolia whose languages belong to the same Turkic family, but there is neither any common desire for political union nor any consciousness of racial unity. The term Pan-Turkish or Pan-Turanian is manifestly not coincident with Pan-Islamic: the Arabs, for example, whose language is the sacred language of Islam, would repudiate the identification. The farthest Eastern Turkic peoples are not Islamic at all, but predominantly Shamanites. As for the racial affinities of the Western section of the Central Asian Turkic peoples, Miss Czaplicka's summing up is that they are predominantly Iranian both in culture and in physique.

The volume classifies the Turkic people more broadly than Vambéry does, designating as Western Turks those west of the Caspian and Afghanistan—as Eastern, those east of the Caspian and north of the Thian Shan and Altai ranges to Mongolia. The Eastern Turkic peoples she subdivides into Iranian, already referred to, and Turanian, whose racial affinities are Mongolian.

Miss Czaplicka's volume is one for the anthropological student, and, like her volume on Aboriginal Siberia (geographically complementary to this one), is marked by thorough research and furnished with full index, appendixes, and bibliography.

JOHN MORRISON.

NOTES ON THE EXHIBITION OF THE EARLY MAPS OF EDINBURGH.

By HARRY R. G. INGLIS, F.S.A.Scot.

ONE of the finest collections of maps of Edinburgh that has ever been brought together is being exhibited in the Society's Rooms, Castle Terrace, Edinburgh, during the first weeks of April; and those who take even a casual interest in old-world affairs will find something worth looking at, as many of the plans are not often available. This is not merely a display of odd maps, but a well-arranged exhibit, containing, almost without exception, all the maps of Edinburgh, collected from various sources to ensure completeness. The following notes on the more interesting features may be of assistance.

The earliest authentic picture-plan of Edinburgh is that believed to be a description of an attack on Edinburgh by English troops in 1544, wherein an unknown artist gives a plan showing the position of the troops, as well as the appearance of the city from the *North side.* (*Exhibit* 1.)

In 1550, Münster's *Cosmographia* contains a description of Edinburgh by Alesius, but the accompanying picture shows clearly that the artist has never seen the city, for he merely drew pictures of churches and buildings of a conventional character, and placed them without much regard to their real situation, so that the view is more amusing than accurate. Arthur's Seat is shown as actually overhanging. (*Exhibit* 2.)

But the plan that will be of greatest interest is the rather gruesome sketch of the scene of the murder of Darnley at Kirk o' Field. It was drawn apparently as early as 1567, and it shows the position of the body, as well as the appearance of the place after the explosion. It is a most realistic production, giving a vivid picture of the scene of the tragedy, and if one takes it as a specimen of the cartographical knowledge of the 1567 period, it is far from crude in its grasp of essential detail. (*Exhibit* 3.)

Following on this, about 1575, appeared a view plan of Edinburgh from the *South side*, issued in a volume by a Dutch publisher, showing the city and its walls; but there is considerable doubt as to how far it can be relied on, as the absence of any outstanding building at Holyrood creates a feeling of distrust, in view of the picture in the 1544 plan. (*Exhibit* 4.)

The first map of Edinburgh in modern style made its appearance as late as 1742, and this plan of the Old Town forms the basis of all those that subsequently appeared. Strange to state, the original copperplate of this map is still extant.

The completion of the North Bridge in 1772 opened up for building purposes what is now known as the "New Town," and the plans of 1767-8 show elaborate designs, with "George Street" as the centre thoroughfare, with "Queen Street" on the one side, "Princes Street" on the other, and "Rose Street" and "Thistle Street" between. Neither "Shamrock Street" nor "Leek Street" ever appear to have been suggested. It is difficult to say whether the "St. Andrew Street" and "St. David Street" were both based on the patron saint idea, or the latter on the generally current connection with David Hume. But there is no doubt as to the associations of "Charlotte Street," "Frederick Street," and "Hanover Street." The infrusion of "Castle Street" in the midst of these names is because of the view one obtains in walking down the street.

The next important surveys worth looking at are those of Ainslie, 1780, and Kincaid, 1784, each giving very great detail. Ainslie's later plan of 1804 is another splendid survey, and this remained the best map till Kirkwood, in 1817, brought out his monster plan of the city—one of the finest surveys ever made. In 1819 Kirkwood went a step further and actually produced a miniature picture map of the New Town, giving the appearance of every building with such fidelity that we can actually recognise in the streets what parts have remained unaltered since 1819. Of all the maps of Edinburgh, this, I think, is the most interesting. Two years later Knox issued a very fine plan, and after this there was little original until W. and A. K. Johnston issued *Lancefield's* splendid large-scale map in 1851, and this, until the

Ordnance Survey was issued in 1852, remained the most minute and accurate plan of Edinburgh. These big original maps formed the basis of the innumerable small maps issued from time to time.

The maps issued in the *Edinburgh Directory* prior to 1855 are not so satisfactory to deal with. They were mostly got up as simply as possible, and apparently the cheapest map that was offered was taken. Therefore, although the maps were often re-dated, in many cases there was little or no change in the outline, while the same map frequently appeared for more than one year without change.

All the plans are being exhibited on the walls, their features and points of interest are mentioned, and it is hoped that in a later issue we may be in a position to give a full and illustrated account, and put in permanent form the result of bringing together this first complete collection of Plans of Edinburgh. It is also extremely likely that, through the generosity of Dr. Bartholomew, we may be able to issue a map of Edinburgh, coloured to show the dates of the opening out of the various districts and streets, and that Mr. Cowan and Mr. Green, through whose generosity the exhibition has been made possible, may be able to add their contribution, to make the details complete.

Perhaps those who are interested in the very early history of Edinburgh may ask the question as to what was the original site of the town. This is not easy to say, because everything points to Edinburgh as *not* being one of the most ancient cities in the Lothians. Captain Mears, in a careful examination of the geographical features, has made a series of drawings, now in the Outlook Tower, Castlehill, of what he believes Edinburgh was like in prehistoric times. He believes that the early settlement may have been at Dunsappie, where the cultivable ground and terraces close to the very defensible hill, would make an ideal situation. In later times he believes that the Castle Rock was occupied, and the town gradually extended until all the ground between the Castle and Holyrood was covered. Geographically this view is quite sound, as the relation of the city in regard to approaches points to its having been off the main highways—the present route from the east by Princes Street and Haymarket having only come into existence after the building of the New Town.

TOPOGRAPHY AND STRATEGY IN THE WAR: A REVIEW.[1]

SINCE August 1914 we have all been amateur strategists, with more or less insight into the problems at issue. The ability not only to understand military operations, but to plan and conduct them, depends in no small measure on the geographical attainments of the critic and the leader. Things have moved in the Army since Lord Roberts complained at the time of the Boer War of the ignorance of maps shown by

[1] *Topography and Strategy in the War.* By Douglas Wilson Johnson. With Maps and Illustrations. London: Constable and Co., 1919. Price 10s. 6d. net.

many of his officers. In every Officer Cadet Battalion nowadays particular attention is paid to the understanding and use of large-scale maps, although the methods of instruction and the attainments of the instructors are not always incapable of improvement. Regarding the maps themselves, some of the examples produced for military purposes by the Ordnance Survey during the war are masterpieces of their kind. If one-tenth of the consummate skill and indefatigable energy exhibited by the Survey Staff were to be applied now to educational purposes, what an impetus would be given to the study of Geography in Britain!

"The violation of Belgian neutrality was predetermined by events which took place in western Europe several million years ago." This is the first sentence of Professor Johnson's book, and it serves as the stimulating introduction to one of the most lucid and well-presented descriptions of the physical structure of the western theatre of battle that we have encountered anywhere. Travelling east from Paris to Metz *via* Reims and Verdun, one would cross five well-marked escarpments. In every case the gentle dip-slope faces west, while the steep scarp fronts the east. Paris is thus provided with five strong natural lines of defence against an enemy coming from the east.

Professor Johnson does not go into structural details, but for geographical readers we may add that the first escarpment (from Paris) marks the edge of a complex of Tertiary sands, clays, and limestones, forming on the whole a low plateau. No one can forget how important a part was played in the summer of 1918 by those formidable *points d'appui*, the Montagne de Reims and the Montagne de Laon. Both these so-called *montagnes* consist of islands or promontories of the massive Tertiary beds that form the first escarpment. Circling round the central nucleus is a series of concentric bands (the "aureoles" of De Lapparent) of Cretaceous and Jurassic beds. The second and third escarpments are formed of Cretaceous rocks, and the fourth and fifth of Jurassic rocks. Just as in southern England towns like Guildford, Dorking, and Lewes grew up at gaps in the chalk ridges, so at most of the gaps in the French escarpments we find important towns. For example, the first escarpment is breached by the Oise at La Fère, by the Vesle at Reims, and by the Marne at Epernay.

One turns with considerable eagerness to Johnson's account of the battles of the Marne. Although the fate of Europe was settled in those critical days of September 1914, even yet the sequence of events is not absolutely clear. Johnson's account differs fundamentally from that of Commandant Litre, as summarised in this *Magazine* (vol. xxxii., 1916, p. 31), and both differ in some material points from the description given by Colonel Buchan in his History. As both Litre and Johnson write primarily from the geographical standpoint, it may be of interest to compare their views. It will be remembered that von Kluck was advancing rapidly on Paris when most unexpectedly he swerved eastwards, leaving his right flank open. A French army, the existence of which von Kluck probably did not suspect, moved from Paris and attacked his right flank, while French and Joffre simultaneously attacked frontally along the line of the Marne. Von Kluck had to retreat

rapidly to avoid disaster; Foch, striking furiously, broke the German centre between the armies of von Bülow and von Hausen; and the whole German line was pushed back to the Aisne.

What part did Topography play in these fateful events? Commandant Litre states that von Kluck was advancing by means of the Oise valley, which runs south-west. On his left another German army was advancing west of and parallel to the Argonne. Owing to the lie of the ground this army was moving south. Thus von Kluck was losing touch with the forces on his left, and it was to regain contact that he made the fatal swing to the east that exposed his right. In addition, the German army west of the Argonne could not receive reinforcements from the east owing to the existence of that considerable barrier. The German armies were therefore withdrawn until contact was re-established all along the line.

Johnson explains the events as a series of attempts on both sides at envelopment, and lays stress on the importance of the east and west river barriers (the Grand Morin, the Petit Morin, the Marne). Von Kluck was a competent general, and knew that the capture of Paris was a secondary affair: his business was to help to destroy the French armies. He moved east, therefore, to get behind the French centre, already dangerously bent. The new (sixth) French army from Paris attacked the German right flank and tried to envelop it. At the same time the British were trying to envelop von Kluck's left (east) flank, and to escape destruction he had to withdraw rapidly north of the Marne. It was the influence of another east-west feature that finally decided the day. East of the central plateau of the Paris Basin lies the barrier of the St. Gond marshes, with the opposing forces on the north and on the south of the marshes, and neither side able to make headway. Foch took advantage of the strength of the natural barrier to remove an army corps from behind the marshes and the Petit Morin gorge. With his strengthened forces he struck with hurricane fury just east of the marshes and pierced the German centre. The whole German line then withdrew behind the protection of the next natural barrier, the east-west trench of the Aisne.

Both writers elucidate the dominant influence of the topography on the movements of the armies, but while Litre emphasises the north-south features on the flanks, Johnson lays stress on the east-west barriers of the centre. On the whole, the latter's views appear to the reviewer to be sounder.

It would be interesting, but would take too long, to discuss Professor Johnson's account of the Verdun attacks. It must suffice to mention that he shows how victory at Verdun was obtained by abandoning the regular fortifications and making use of the strong natural positions in the dissected escarpment belt farther from the city. The escarpment and the clay plain of the Woëvre to the east (mud and marsh in spring) formed an impregnable barrier, so that attacks had to be made from the north on a narrow front and over a difficult terrain.

The Russian campaign is next dealt with. The most casual newspaper reader knows the decisive part played by topographical conditions

in the crushing defeat of the Russians at Tannenberg. A graphic description is given of the wilderness of hills, lakes, swamps, and moraines that make up the country of the Mazurian Lakes.

We next pass to the Italian theatre of war, then to the campaigns against Serbia, and the last part of the book is taken up with a description of the invasion of Rumania, and the manner in which the operations were affected by land features.

The book is well illustrated by maps, photographs, and diagrams, particularly telling use being made of the "block diagrams" for illustrating land features. The work assumes no special knowledge either of military principles or technical geography, and can be warmly recommended to the general reader. The author has more than fulfilled his aim "of providing, in a single volume, such maps, diagrams, photographs, and word descriptions as will provide the reader with good mental pictures of those fields on which the battles of democracy were waged."

FREDERICK MORT.

OBITUARY

CAPTAIN THOMAS ROBERTSON, 1855-1918.

CAPTAIN ROBERTSON was born at Peterhead, and there is no doubt that his selection of a career was brought about by his close association with the sea from childhood, and the fact that his father and both his grandfathers had been well-known whaling captains. His apprenticeship was served on board a Peterhead merchant vessel trading to Australia and China, but on his return to this country he decided to go in for the whale and seal fishery. He went to the Arctic first as mate of the *Jan Mayen* of Dundee, and very soon thereafter, at the early age of twenty-four, was appointed master of the *Polar Star*, in which he made several voyages to the East Greenland and the Davis Straits seal and whale fisheries. This was before the days of the general use of steam on whaling craft, and this early experience gained in handling a sailing vessel amidst the ponderous northern icefields in all weathers was a valuable asset in later years when he was in command of other vessels with auxiliary power. He was master of the *Balaena* during the visit of the Dundee whaling fleet to the Antarctic in 1892-93, and ten years later accompanied the *Scotia* Antarctic Expedition in the same capacity. He was a superb seaman and supreme among ice masters, and in his long association (nearly forty years) with Polar work had the unique distinction of never having lost a ship nor a man. He was a man to ride the waters with—he failed you never, and in the numerous emergencies which from time to time arose amidst the grinding icefields, where a moment's hesitation in giving an order might have involved disaster, he was ever ready to combat the situation with success. His natural inherited gifts as an ice pilot were supplemented by an intuition that on occasion seemed almost miraculous. This was strikingly manifest several times in the Weddell Sea during the Scottish National

Antarctic Expedition, whose vessel, though twice beset, was skilfully extricated, and thus escaped the fate of the *Antarctic*, *Deutschland*, and *Endurance*.

Although not a scientist in the strict sense of the term, he was thoroughly in sympathy with research, and to the physicists and naturalists, who often accompanied him on his Polar voyages, every assistance was given. He was in command of the *Scotia* during the first season of the ice patrol of the Atlantic conducted by the Board of Trade following the loss of the *Titanic*. He contributed several logs dealing with Arctic weather conditions to the Meteorological Office, and ice reports to the Danish Hydrographic Department. His services to geographical exploration were recognised by an award from the Royal Geographical Society, and also by the silver medal of this Society, while for saving a shipwrecked crew in the Greenland Sea he received a handsome presentation from the Norwegian Government.

Captain Robertson died at Dundee on 14th December 1918, after a long illness. R. C. M.

GEOGRAPHICAL NOTES.

Europe.

Petroleum in the United Kingdom.—To a recent issue of *Nature* Mr. V. C. Illing contributes an article which, though bearing the title of "Boring for Oil in the United Kingdom," discusses the general problem of the formation and preservation of deposits of free, crude petroleum.

He states that, with a few exceptions, the oil-fields of the world fall into two main groups: (1) those in rocks of Tertiary and Upper Cretaceous (Secondary) age, and (2) those of Palæozoic (Primary) age. The former are situated along the trend of the Tertiary geosynclinals, this being the name given to the great regional depressions in the earth's crust. The beds containing the oil have in this case generally been affected by folding movements, and it is usual to find surface indications of the presence of the oil. These surface indications Mr. Illing regards as a proof that erosion is permitting the oil to escape at the surface slowly, while the productive wells sunk by man in the areas show that the natural loss has not, in this case, as yet proceeded very far, large underground reservoirs still persisting from which only insignificant leakage has occurred. In other words, he regards petroleum deposits as essentially unstable, and liable to spontaneous disappearance.

If this be so, how then can we explain the presence of oil in the ancient Palæozoic beds? The author finds the answer in the special and "altogether abnormal" characters of those Palæozoic rocks in which oil is worked. Oil-fields of this age are largely confined to North America, and occur in areas where folding is either absent or slight. The presence of surface indications in them is exceptional.

Marked faulting is also absent, and where the Appalachian oil-fields approach the areas of more pronounced folding the oil disappears. These facts he explains as follows: oil production on a small scale is a common phenomenon in rocks, but before there can be an accumulation on a scale sufficient to establish an oil-field certain conditions must be satisfied. The dip must permit of oil concentration; there must be porous strata in which the oil can accumulate; there must be a cover of impermeable rock to prevent it from escaping: even when this last condition is satisfied originally, folding and faulting, followed by long-continued denudation, may permit the oil to escape, as it is escaping in most of the known Tertiary oil-fields.

Applying these general principles to British conditions, Mr. Illing finds little reason to believe that the present search for large commercial supplies of petroleum in this country is likely to meet with success. He considers, in the first place, that Tertiary and Secondary beds must be excluded as possible sources of supplies. It is in beds of Carboniferous age chiefly that British enthusiasts hope to find oil. Mr. Illing admits that petroleum indications here are numerous, but regards them as mainly insignificant. The fact that British Carboniferous strata are extensively folded and faulted, and have been subjected to prolonged denudation, has, in his opinion, given every opportunity for any oil contained to escape, and leads to the pessimistic conclusion just quoted.

New Balkan Review.—We have received a copy of the first issue of *The Balkan Review*, a new journal, edited by Mr. Crawford Price, and devoted to the interests of the Balkan Peninsula in a large sense, which is to appear monthly. The first number contains, among other articles, an account of an interview with M. Nicolas Misu, the Roumanian Minister in London, on the German régime in occupied Roumania, and one on Bulgaria's aims in the war, by the editor. M. Misu gives a terrible picture of the sufferings of the Roumanians during the period of occupation. The peasants were deprived even of their seed corn in addition to their cattle and animals of all kinds. In consequence only 300,000 hectares were sown last autumn, in place of the usual 1,400,000, with the result that after this year's harvest there will be no surplus available for export, while till the harvest ripens the people will require to be fed by the Allies. On the other hand, the Germans re-opened the oil-wells, repaired the plant, and imported new machinery where this was necessary, so that the output of oil is already almost equal to that in normal times, and a large amount is available for export, once transport facilities have been restored. In his article on Bulgaria Mr. Price produces a considerable amount of documentary evidence to prove that very early in the war Bulgaria had resolved to throw in her lot with the Central Powers, and that no concessions on the part of the Allies could have altered this determination. Other articles deal with various Greek problems, including that of the Dodecanese; the position of these islands is shown on a sketch-map which forms the frontispiece of the number.

The Water-power of Iceland.—A short article in *La Géographie*, xxxii. p. 188, gives a somewhat optimistic account of proposals for utilising the water-power of this island, the proposals themselves having apparently met with considerable support in Norway and Denmark. At present, as is well known, Iceland, despite its size, is an excessively poor and sparsely-peopled land. The coasts swarm with fish, but the interior has little to offer save some patches of land capable of producing potatoes, and the pastures on which chiefly sheep and the native ponies are reared. From the human standpoint the island suffers from the amount of elevated land, and from the somewhat unusual combination of active volcanoes and extensive glaciation. The two last involve the double risk of earthquake shock, and of devastating floods due to the sudden melting by volcanic action of ice and snow, or the emptying of lakes from the same cause. But the reserves of water in the glaciers, and the marked relief, both greatly increase the potential water-power of the area, which has been estimated at 4,000,000 H.P., the island, in proportion to its area, being better endowed in this respect than even Norway or Sweden. Further, owing to its position and exposure to westerly winds in winter, the seasonal variation in the glacier-fed streams is much less marked than in areas with colder and drier winters. An Icelandic-Norwegian company has already in view a project for utilising the hydraulic force of the Thjorsa River, the longest in Iceland, and, according to the preliminary estimates made, the falls on this stream can supply 800,000 H.P. during the five months of low water, and 1,100,000 H.P. during the rest of the year. The largest fall alone is capable of producing 500,000 H.P. for six months of the year.

For the utilisation of the power two sets of schemes are proposed. The first involves the establishment of electro-chemical, *e.g.* nitrate works, and of electro-metallurgical works. The other scheme is more elaborate, and involves the assistance of a large Danish shipping company. It proposes to use the power in flour mills, the grain being imported from Saskatchewan by the Port Nelson-Hudson Bay route, and the flour exported to the continent of Europe. The company proposes to establish a regular service between Port Nelson and Iceland during the short season when navigation is possible in Hudson Bay. In Iceland the scheme involves the construction of a railway from the Thjorsa River to Reykjavik. The difficulties are, of course, obvious—the scarcity of labour, the climate, the risk of floods, earthquakes and eruptions—but the promoters calculate that the first cost would be insignificant.

ASIA.

The Turk in History and Geography.—The American Geographical Society has recently taken over the educational publication known as the *Journal of Geography*, and with the change in management certain modifications of format and character have been made. The first issue under the new editorship is that for January of the present year, and among other articles it contains a striking account of the Turk, considered alike in relation to the geographical conditions of the

vast area of steppe land which is his natural home, and to the history of western Asia since the early centuries of the Christian era. The article is written with great vividness and effectiveness, the cultural response to the environmental conditions being well brought out. The author, Mr. Leon Dominian, quotes a striking passage from the only national poem of the Turks as summing up the duties of the individual: "He thrusts, he kills, or, fighting, dies," and ends with the statement that "the history of this great race of conquerors is drawing to a dishonoured close before the gaze of the whole civilised world." The article, to which is added an editorial note on "The Conquest of the Nomad in Central Asia," and a list of references, is well worth reading as a geographical commentary on current history.

Africa.

Life Zones in Eastern Equatorial Africa.—In the October issue of the *Geographical Review* Mr. Edmund Heller publishes an article which, though entitled "Geographical Barriers to the Distribution of Big Game Animals in Africa," gives in point of fact a general account of the climatic zones, flora, fauna, and native tribes of a part of East Africa. Mr. Heller recognises five zones in this area. (1) The Coastal zone, which is narrow, with an average width of only fifteen miles, and has an equable, somewhat moist, climate, with no truly arid period. The sable antelope is characteristic. (2) Beyond the coastal belt, and covering an immense area in the interior, comes the Bush-desert or *Nyika* zone, which rises from 100 to 3000 feet above sea-level, and is characterised by its scattered bushes and trees of markedly desert types. The zone embraces much of the Upper Nile watershed region, and its most important streams are this river and the Tana, both of which act markedly as barriers to the distribution of the great mammals. In regard to the Tana, the presence of crocodiles seems to be important in this connection, and a case in which a full-grown rhinoceros was pulled down by these animals while it was in the act of swimming across the river is mentioned. In the case of the Nile, the marginal swamps and the masses of decaying vegetation offer a great obstacle to movement. It is noted that five large mammals—the black rhinoceros, the Cape eland, Burchell's zebra, the five-horned giraffe, and the red-fronted gazelle—occur on the east bank of the river here, but not on the west, while similarly the white rhinoceros, the giant eland, and the Congo giraffe occur on the west, but not on the east bank. (3) Above the *nyika* comes the Highland Veldt zone, consisting of moist, grassy plains, and ascending to a height of some 8000 feet. Here great herds of game animals are common, and before the advent of rinderpest the powerful, cattle-keeping Masai were the lords of the land. (4) Scattered in patches through the High Veldt, dependent rather on soil than on altitude, we find eastward extensions of the Tropical Forest zone. To some extent, indeed, the high grassy plains are artificial, being due to forest destruction on the part of agricultural peoples. In the belt of the tropical forest occur the Congo antelope and elephants,

as well as other forms. Species of trees are numerous. (5) At altitudes above about 8000 feet, and extending to 11,000 feet, there occurs a zone of Highland Forest, with many large mammals. The margin of this forest zone is inhabited by agricultural native tribes, notably the Kikuyu, who are steadily causing the forest to retreat as they clear new land. The article is illustrated by a fine series of views, showing characteristic types of scenery in the different areas dealt with.

America.

The Indians of the High Sierra of Peru.—In vol. xxvii. of the *Bulletin* of the Neuchatel Society of Geography, M. Ernest Godet gives an interesting account of the Indians of the region of Huancavelica in Peru. The region is in the province of Cerro de Pasco, the village of Huaron within it being situated some forty miles to the south-west of that town, at an altitude of over 16,000 feet, and is reached from it by a mule-track. Cerro de Pasco itself, it will be recollected, is connected with Callao by a railway, and was formerly an important town owing to the presence of mines of argentiferous lead. The silver mines have now been largely abandoned owing to the cost of working, but the Andes here are rich in ores of copper, lead, zinc, and other minerals, copper especially being now worked near Cerro de Pasco. M. Godet, who is an engineer, spent eight consecutive months in the Huancavelica district in the year 1915, while engaged in the construction of a hydro-electric plant, and his paper is based upon observations made during his visit. The power is derived from a series of small lakes or "lagunes" fed by rain and melting snow. Apart from the lakes vast marshes occur, crossed by streams, and it is from these swampy plains that the rocky *massifs*, with their mineral veins, emerge. The region is bleak and desolate in the extreme, and yields little to man apart from the ores.

The climate shows two well-marked seasons, the *dry*, lasting from May to October, when the days are bright and sunny, and the nights cold and clear, with a sudden drop of temperature at sundown, and the *wet*, which lasts from October to May, characterised by daily thunderstorms. Normally the sky at this season becomes overcast at mid-day, the temperature drops suddenly, a furious wind springs up, driving before it hailstones which whiten the soil in a few moments. Then the storm breaks, the flashes of lightning and the peals of thunder being almost continuous. The storm usually lasts about twenty minutes, but may be repeated three or four times during the afternoon. It is followed by rain or snow which continues into the night. In the morning the snow melts and swells the lakes and streams. Deaths from lightning, both among men and animals, are frequent. The rapid changes of temperature are dangerous, especially for strangers, and sudden attacks of pneumonia cause many deaths. The capacity for work is also diminished by the elevation, which has various injurious effects on the constitution. The Indians can apparently only work by

the aid of coca, and a satchel containing a provision of dried leaves of this plant form an essential part of their equipment. They also carry a receptacle containing lime, and particles of this are mingled with the leaves during the process of chewing. When engaged in hard work it is said that an Indian may chew as much as two pounds of dried leaves in a day, but it is not stated if any ill effects are produced. The Indians also indulge greatly in alcohol, and their lives appear to be short.

Plants at this altitude are relatively few, the most important in human life being a kind of reed (*Distichia muscoides*), which is used as a thatch for the houses, and furnishes a form of peat used as fuel. This, together with the dry dung of the llamas, is the only combustible found, for there is no wood. The domestic animals consist of the llama, the alpaca, the guinea-pig (used as food), and the dog, used in guarding the flocks. To these may be added the horse, mule, cow, pig, and sheep, and, exceptionally, the cat and common fowl. The last two, which have been introduced, do not thrive at this elevation, and often die of congestion.

A certain proportion of the Indians are employed in the mines. The only real occupation of those not so employed is the driving of pack trains of llamas, which are the beasts of burden. The llama, in addition to this use, furnishes wool for clothing, and for supplying the cords with which the loads are attached. Its skin is used to make sandals and bedding, and the flesh is eaten. The alpaca will not carry loads, but its wool is much prized. The llamas will carry a weight of about one hundred pounds, but the animals can only work one week out of three or four, owing to the poor food supplied.

Although the profits of the carrying trade form the chief resource of the Indian, he also carries on a small trade in woollen goods and pottery. Spinning is exclusively a woman's occupation, and the women carry a simple form of spindle with them wherever they go. Weaving, on the other hand, is carried on by the men, either during the wet season or when their llamas are resting after a journey. Though the primary object is to obtain the necessary warm garments for personal use, and the cords used in place of ropes, a small surplus is available for sale. The same statement may be made in regard to pottery, though in this case there is a larger surplus, and it is from the sale of pots that the inhabitants of the Sierra obtain their supplies of maize, potatoes, and so forth. The manufacture of the pots is again the work of the women, who collect the clay which is found at the edges of the lakes, and also at the surface in certain parts of the mountains. The women also mould the pots and decorate them, but the process of baking is carried on by the men. A number of interesting illustrations, both of the woollen goods and of the native pottery, are included in the paper.

Nominally the Indians are Catholics, but traces of the old worship of sun and moon remain, especially in the addition of emblems of these to the arms of the crucifixes in the churches.

General.

The Royal Geographical Society's Medals.—The King has been pleased to approve the award of the Royal Medals of the Royal Geographical Society as follows:—

The Founder's Medal to Colonel E. M. Jack, C.M.G., D.S.O., General Staff, for his geographical work on the Western Front; and the Patron's Medal to Professor William Morris Davis, of Harvard University, for his eminence in the development of physical geography.

The Victoria Medal is awarded by the Council to Professor J. W. Gregory, F.R.S., of Glasgow University, for his many and important contributions to geographical science; the Murchison Grant to Dr. W. M. Strong, of the north-eastern district, Papua, for his journeys and surveys in New Guinea; the Cuthbert Peek Grant to Professor Rudmose Brown, of Sheffield University, for his geographical work in the Antarctic and in Spitsbergen; the Back Grant to the Venerable Archdeacon Stuck, of Fort Yukon, for his travels in Alaska and ascent of Mt. McKinley; and the Gill Memorial to Mr. W. J. Harding King, for his investigations of desert conditions in Northern Africa.

Meeting of the British Association.—After an interval of two years, the result of war conditions, the British Association is to meet once again this summer. The meeting will be at Bournemouth, and will last from September 9-13. The Hon. Sir Charles Parsons is the President.

Personal.—The Directors of the Geographical Society of Chicago have awarded the Helen Culver Gold Medal to Dr. J. G. Bartholomew, of the Edinburgh Geographical Institute, in recognition of his services to cartography. They specify in detail the Survey Atlases of Scotland and of England and Wales, the Atlas of Meteorology, and the Atlas of Zoogeography, no less than the multitude of maps in minor atlases, as setting standards of high achievement in cartography.

The same Society has also awarded its medal to Mr. George C. Chisholm, Secretary of the Royal Scottish Geographical Society and Lecturer in Geography in Edinburgh University, in recognition of his great services to geography in the preparation of his *Gazetteer*, and in his studies in economic geography, "which have been so largely instrumental in the establishment of this branch of the science of geography in the colleges and schools of the English-speaking world."

Notice to Members.—The Society has a very small number of spare copies of the *Magazine* for October 1918, and it would be a great obligation if members who do not wish to bind their sets would return this number to the Rooms in Edinburgh.

Economic Geography.

A New French Coal Field.—It has become a commonplace that the great war has been largely a war of industry, for it has been carried

on by the help of the output of almost all types of factories. Necessarily, therefore, France, with a less developed industry than either Britain or Germany, has found great difficulty in meeting the demands of her armies in the field, especially in view of the loss, at the very beginning, of her most industrialised departments. Strenuous efforts have, therefore, been made to foster the necessary industries in other parts of the country. Largely on account of the censorship, the full tale of these efforts has not yet been told, though now the scientific papers are beginning to outline some of the advances made. A short note in the *Revue Générale des Sciences* for February, for example, gives some details of a new coal field which is being developed in the vicinity of Lyons. That town has always suffered from the high freights charged on the coal of the St. Etienne field, on which its industries depend. That the St. Etienne basin is prolonged on the left bank of the Rhone has long been known, but till recently workable seams had not been discovered on this bank. In 1913, however, two seams were discovered at a depth of 1800 feet at Mions, south east of the town of Lyons. Subsequent research has shown that the beds, at depths varying from about 1000 to 2300 feet, extend over a distance of twelve miles, reaching the department of the Ain. The field is thus more extensive than that of St. Etienne, but apparently not so rich, and more difficult to work, owing especially to the water-bearing beds. Great hopes are entertained of the future of the field, a figure of 1,000,000 tons as a possible annual output having been mentioned, though not, it would appear, on any very certain grounds. The development of the field, however, if it at all comes up to expectations, should make a great difference to the industries of the town of Lyons.

The Egyptian Oil Fields.—Egypt, as is well known, suffers severely from lack of native fuel. Normally she depends chiefly upon the United Kingdom for coal, of which the annual import is some 1½ million tons. During the war, with the world-shortage of tonnage, coal has been difficult to obtain, and the fuel question has been serious. It has led to the available supplies of wood being drawn upon to a serious extent, and to the employment of engines to produce gas from vegetable refuse. Despite these palliatives, however, the situation in the country would have been critical had it not been that the Egyptian oil fields have been able to increase production very largely during the war period. The chief oil fields, indeed the only productive ones, are situated on the west coast of the Gulf of Suez, some 150-180 miles from the town of Suez. The more northerly field, that of Gemsah, began to undergo development on a considerable scale in 1911, but after 1914, when nearly 98,000 tons of raw oil were produced, showed signs of exhaustion. Fortunately, however, the Hurghada field, some 30 miles to the south, proved more than able to make up for the diminishing yield in the northern field, as is shown by the fact that during the first eleven months of 1918 no less than about 263,000 tons of crude oil were produced from the two fields. Hurghada is situated on the sea, and a port has been constructed here in mid-desert, from which oil-

steamers carry the crude oil to the refinery at Suez. Here motor spirit, liquid fuel, illuminating and lubricating oils are all produced. Further prospecting is to be carried out so soon as the conditions make this possible. The above details are taken from the Egyptian Section of *The Times Trade Supplement* for February, which contains a number of interesting details in regard to Egyptian conditions generally.

EDUCATIONAL.

Chair of Oceanography at Liverpool.—A Chair of Oceanography, the first on the subject in the British Isles, has been endowed at Liverpool University, by Professor and Mrs. Herdman, who two years ago endowed a Chair of Geology at the same university in memory of their son, George Herdman, killed in the war. Professor Herdman, who is Professor of Natural History at Liverpool University, will be the first Professor of Oceanography until October 1920, when Dr. James Johnston, who in the meantime will be lecturer on the subject, will become professor. The donors of the chair, in offering the gift to the university, state that they do so in the belief that oceanography—the science of the sea in all aspects—affords an immense field for both scientific research and industrial application, and that Liverpool, a great seaport having intimate relations with the oceans of the world, is an appropriate centre for such work. They express the hope that the department will continue the work of the Fisheries Laboratory at the university, the Port Erin biological station, and the scientific investigations of the Isle of Man Fishery Board and the Lancashire and Western Sea Fisheries Committee.

Geography at Strasburg University.—Even before the Armistice, and while to many the issue of the war still seemed to hang in the balance, proposals had already been made in France for the restoration of a great French University at Strasburg. Prof. Christian Pfister of the Sorbonne, in a *Rapport* published in 1917, not only discusses in detail the past history of the University, but makes a number of detailed proposals for the future. These include, among the more general points, schemes for attracting to Strasburg not only students from other parts of France, but also from allied and neutral countries, especially Britain, the United States, and Belgium. The position of the town, and the beautiful scenery in its vicinity, especially the easy access to the Vosges Mountains, combine to render it attractive to foreigners, and the fact that, at least for the first few years, German and French are both to be used in the courses and examinations, and that instruction in the German language and literature is to be a feature of the University, constitute additional reasons why it should be frequented by foreign students. Further, before the war at least, living was cheap at Strasburg, and suitable accommodation for students readily obtainable.

As to the subject of geography, the courses are to be strengthened

by the addition of a professorship in physical geography, not represented in the German institution, and there is a proposal that the geographical teaching given in the Arts faculty should be united with that given in the faculty of Science, so as to constitute an Institute of Geography.

Easter Meeting of Regional Association.—In connection with the short note on this subject which appeared in our March issue, p. 113, we have now received from the organisers some further material. This includes a provisional programme of the meeting, which has been organised by Mr. P. H. L'Estrange and the members of the Malvern Geographical Society, and is to be held in Malvern College. Various excursions have been arranged for, and Mr. and Mrs. Sydney W. Morgan and other members of the local Geographical Society have compiled a short description of the area for the use of members. There will also be an exhibition of the results, so far achieved, of a local Regional Survey. We have also received the first annual *Report* of the Regional Association, which was constituted in 1918, containing a list of the office-bearers.

NEW BOOKS.

EUROPE.

Cities and Sea-coasts and Islands. By Arthur Symons. London: W. Collins, Sons and Co., Ltd., 1918. *Price 7s. 6d. net.*

This book consists of a series of essays, none very recent, and some dating over twenty-five years back, in which the author gives his impressions of various scenes at home and abroad. Nearly half the book is devoted to Spain, the essays in this section including the inevitable description of a bull-fight. Elsewhere there are some interesting sketches of the coast of Cornwall, and an account of a trip to the Aran Islands, in Galway Bay, not very frequently visited by tourists. Necessarily, however, the main interest of the book is literary and artistic rather than geographical, for it deals with the response of a sensitive mind to environmental conditions rather than with observations made.

Petrograd, the City of Trouble. By Meriel Buchanan. London: W. Collins, Sons and Co., Ltd. *Price 7s. 6d. net.*

The situation in Russia is so obscure that we welcome any attempt to make it clear, and for this reason, if there were no others, the attempt by Miss Buchanan, who is the daughter of our Ambassador at Petrograd, to give to the world what Mr. Hugh Walpole in his foreword to her book calls "a sense of the *atmosphere* of Russia under the shock and terror of recent world-shaking events," is very acceptable. It is obvious that Miss Buchanan had opportunities such as are afforded to few of our country-people to know something of the inside track of affairs in the Russian capital, and we find in her simple, unaffected and vivid story matter of unusual interest. One cannot but admire the courage of the author herself, and of her mother, in remaining at the side of the Ambassador throughout the Bolshevik rising and the anarchy of 1917-18, when his post was one of danger

and when the ladies were repeatedly urged to seek their own safety by leaving Petrograd.

It is plain that Miss Buchanan remains a lover of Russia, in spite of all that she has seen and experienced in that uncanny country. She pleads for a better understanding of Russia on the part of our people at home who cannot know or realise what were the sufferings of the Russian armies and people during the first years of the war, nor the causes for the terrible war-weariness which overcame them. It is of course notorious that this feeling was stimulated and played upon by the subtle workings of German agents, until the Russians were tempted to break away from the Allies, and to desert them in their hour of need. Miss Buchanan asks the question, "Do the people who say 'Russia has betrayed us! Russia has let us down! We really don't care what happens to Russia!' know all the cause and reason of that terrible war-weariness? I think hardly any other soldiers in the world would have endured what the Russian soldiers endured or would have fought under the same conditions, without questioning the powers that seemed to look on them, not as an army of human men, but just so many cattle whose sufferings were of very little account and whose lives were of no value." She adds: "Germany, with her marvellous organisation, knew how to make Russia's agony serve her own ends, and one can hardly wonder that the Bolsheviks' promises of 'Bread—Peace—and Freedom' should have tempted a people uneducated and untaught, and worn out by three years of untold suffering."

Miss Buchanan holds strongly the view that the Emperor was perfectly loyal to the Allies, and she denies the accusation brought against the Empress of working in the interests of Germany. She believes that the one wish of the Empress was to hand the autocracy unimpaired down to her son, and that in this respect she forced the Emperor to carry on a reactionary policy, and to select Ministers who would further that end. Her idea is that Protopotoff, the Czar's Minister of the Interior, was partially insane, a follower of Rasputin, and that he played on the feelings of the Empress. As for Kerensky, Miss Buchanan believes that he was an honest man and a patriot, and that, though he made heroic efforts to keep the army together, he was a dreamer of dreams who hesitated when prompt action might have saved the situation after the revolution and before the Bolsheviks usurped the power of the government. The story as told by Miss Buchanan, from the first revolution in March 1917 until the time of our Ambassador's departure from the capital, is one which will be followed with intense interest. Her descriptions of the glories of summer in the Gulf of Finland serve to give some relief to a narrative which is necessarily grim, and we venture, in taking leave of Miss Buchanan, to quote the concluding words of a very attractive book:—"'Russia will not let you forget her!' The words come back to me over and over again, and across the miles of sea and snow and mountains the voice of Russia calls, the eyes of Russia smile their elusive, haunted smile, and the hands of Russia are stretched out asking for help in her hour of need."

Shrines in Alsace-Lorraine. By E. Marianne H. M'Kerlie. London and Edinburgh: Sands and Co., 1918. *Price* 4*s. net.*

The Question of Alsace and Lorraine. By Thos. Welling Balch. Philadelphia: Allen, Lane and Scott, 1918.

We have here two elegant, æsthetic, and well-illustrated books upon a subject bristling with political importance. Miss M'Kerlie's is the result of an autumn sojourn in Alsace-Lorraine in 1912, during which she studied the records there of the Irish-Scottish monks of the 6th and 7th centuries. She narrates the history

of Ste. Odile, the patron saint of Alsace, whose shrine at Hohenbourg (a spur of the Vosges) has been long visited by pilgrims, including Charlemagne. The Mont Ste. Odile has been called "the heart of Alsace" and its convent is served by "Sisters." Ste. Odile was buried in the convent's chapel, and Rene Bazin says "in this place all Alsace for centuries has knelt." Another Alsatian shrine is "Les Trois Epis," where the Virgin, holding three ears of corn, appeared to a blacksmith. The authoress describes Colmar and then Lorraine, and refers to the great Irish missionary St. Columban, who did here what St. Columba did for Scotland. Remiremont and its Abbey, the Marches of Lorraine, Vaucouleurs, Le Bois Chenu, and Champagne and L'Ile de France complete a volume of much religious interest.

Mr. Balch visited Alsace and Lorraine frequently between 1890 and 1897, and has studied their history ever since. He considers that their annexation by Germany in 1871 was one of the chief factors that brought about the late war. He refers to the passionate attachment of their inhabitants to France and the vain efforts of the Germans to remove it. To Americans, St. Die in Eastern Lorraine is especially interesting, as it was there in 1507 that the famous cartographer Martin Waldseemuller gave the name "America" to the continent which he thought Amerigo had discovered. Further, it was from Metz that in 1777 the Marquis de la Fayette, then a young officer of nineteen, hurried to America to fight in the War of Independence. Mr. Balch points out that the Germans took the Metz district "because of the rich iron ore deposits in the soil." He also reminds us that "la Marseillaise" was composed in Strasbourg in 1792, and forms "one of the most potent causes of attachment of France for Alsace."

Highways and Byways in Northampton and Rutland.. By Herbert A. Evans. With illustrations by Frederick L. Griggs. London: Macmillan and Co., Ltd., 1918. *Price 6s. net.*

On opening the book and glancing at the illustrations one's first impression is "a country of church spires," and indeed this is an aspect which is seldom absent from the reader's view. Besides possessing in Peterborough Cathedral an ecclesiastical edifice of first rank, Northampton is rich in the character and variety of its parish churches, some of which date from Saxon times. It is thus a congenial subject for the erudite pen of Mr. H. A. Evans, the author of the excellent volume in this series upon Oxford and the Cotswolds. If we were to select a typical example from the pages, we might give the following: "Corby Church is a good specimen of Early English, with a Decorated chancel and a lofty porch vaulted in three bays. The whole has been restored and a north aisle added. Every twenty years, under the pretended shelter of a charter conferred by Queen Bess, the village keeps high festival: the roads are barred and every one entering the place is compelled either to sit in the stocks or to ride astride on a pole carried through the streets by the villagers. He will, I imagine, prefer to escape these penalties by the payment of a small fine. My usual welcome awaits me at the Sondes Arms."

There is an immense variety of information, and not the least interesting of the topics discussed is that of hunting. The Pytchley and Fitzwilliam packs belong specially to these counties, but a remarkable number of famous packs range the district.

Mr. Griggs' illustrations are excellent, and of the whole book we may say that those who know the country best will find fresh interest in these pleasant pages, and that strangers to it will wish to be so no longer.

British Rainfall, 1917. On the Distribution of Rain in Space and Time over the British Isles during the year 1917, as recorded by more than 5000 observers in Great Britain and Ireland, and discussed with articles upon various branches of rainfall work. By Hugh Robert Mill and Carle Salter. Fifty-seventh annual volume. London: Edward Stanford, 1918. *Price* 10*s.*

Despite many difficulties Dr. Mill, with whom, as is shown by the title-page, is now associated Mr. Carle Salter as joint-director, has been able to issue his annual volume as usual. Among the special articles of the volume is one on the great rainstorm which occurred in south-west England on June 28, 1918, the account being illustrated by a coloured map which forms the frontispiece of the volume. During this storm the heaviest rain occurred on the Quantock Hills and round Bruton, Somersetshire, where the amount which fell surpassed by a broad margin any previously recorded daily fall in the British Islands. At Sexey's School, Bruton, the reading of the rain gauge was 9·56 in. in the twenty-four hours, the previous highest record for the same period being at Kinlochquoich, on Oct. 11, 1916, where the reading was 8·20 in. As a result of the heavy precipitation, widespread flooding was caused in the town of Bruton and the neighbourhood. It is worth note as a comparison that during the *year* the total fall recorded at Edinburgh City Observatory was only 20 in.—that is, little more than twice the fall in one *day* at Bruton. Another article discusses the heavy snowfalls of the year 1917.

The American Pocket Guide Book to Places of Interest in Great Britain and Ireland. For the use of Overseas Troops. London: Geo. Philip and Son. *Price* 3*s.* 6*d.*

This little book, which has been compiled by the Mileage Section, Headquarters American Troops in England, contains a railway map of the British Islands, and the Overseas Club "Map and Guide" to London. It is arranged alphabetically, and gives very brief notes on the chief towns in the United Kingdom and their surroundings, a list of some important authors under the heading of "Literary Synopsis," a summary of historical events, a list of suggested itineraries, and some information as regards huts, hostels, etc. The book has been rigorously censored; there is no hint, for example, of any special interest that Inverness might possess for American troops, and is too condensed to be of much value to natives of "little old England" and the neighbouring lands. Its chief interest here will probably be to recall to later generations those days—which already seem distant—when for the first time in history American soldiers and sailors in numbers became familiar sights in the streets of many of our towns, and the mythical Russians of the first year of war were replaced by very visible and well-equipped troops, with whose aid victory was finally won.

Sidelights on Scottish History. By Michael Barrett, O.S.B., of Fort Augustus Abbey. Edinburgh: Sands and Co., 1918. *Price* 6*s.* 6*d.*

This book consists of a series of essays, several of which have already appeared in Catholic periodicals, dealing for the most part with Pre-Reformation Scotland. The first two essays, entitled respectively "When Edinburgh was Catholic" and "When Glasgow was Catholic," give interesting accounts of the two cities in earlier days, with special reference to ecclesiastical foundations, and are the only two which can be said to have direct interest for the geographer. The others treat of various historical subjects, and all are written definitely from the Catholic point of view.

The Nations' Histories. Rome, by E. O'Neill, M.A. *Switzerland*, by C. F Cameron, B.A. London and Edinburgh: T. C. and E. C. Jack, 1918. *Price 5s. each.*

We have already reviewed here other volumes of this useful series, the members of which are all arranged on a common plan. The two named above, both of which are devoted to regions much visited by tourists when conditions permit, may be recommended to the traveller as aids to a right perspective. If in the case of Rome a certain amount of historical knowledge may generally be assumed, it is certain that the average visitor to Switzerland knows little, if anything, of the past of the country, and yet, as Mr. Cameron points out anew, that past is rich in stirring incidents.

Both books are well illustrated, and the Swiss volume has a sketch-map, while that on Rome contains plans of the imperial and modern city. A sketch-map of the surrounding country would have been a useful adjunct to this volume.

ASIA.

A Modern Pilgrim in Mecca. By A. J. B. Wavell, F.R.G.S. With an Introduction by Major Leonard Darwin. New cheaper impression. London: Constable and Co., Ltd., 1918. *Price 2s. 6d. net.*

In Vol. xxix. p. 53, we reviewed Mr. Wavell's entertaining volume entitled *A Modern Pilgrim in Mecca, and a Siege in Sanaa.* The present reprint contains only Part I. of that book, for the *Siege in Sanaa* is to be reprinted later as another volume. To the re-issue Major Leonard Darwin contributes a short account of Major Wavell's life, for the latter, after raising a small force of Arabs at Mombasa in 1914, and taking an active part in the East African campaign, was killed in action with German forces near the Uganda railway, in January 1916. He was not thirty-four at the time of his death, and Major Darwin's sympathetic account of his adventurous career forms an admirable introduction to the description of the visit to Medina and Mecca in 1908, which gains rather than loses by its separation from the second part of the original work.

Not all the illustrations of the original have been reproduced, but there is a portrait of the author, and a small, rather crowded, and not very clear, map at the end.

The Playground of the Far East. By the Rev. Walter Weston, M.A., F.R.G.S. With maps and illustrations. London: John Murray, 1918. *Price 18s. net.*

The present volume is the second published by its author on the subject of Japan, its Highlands and Highlanders. The first, *Mountaineering in the Japanese Alps*, was written over twenty years ago, and since that date Japanese mountaineering has undergone enormous development and extension in a modern sense. No one is better qualified than Mr. Weston to write on the Japanese highlands, their scenery, forests, climbs, peoples and traditions. A long residence in the Island Empire of the East, as British chaplain at Yokohama, an intimate knowledge of the language and literatures of the country, above all, an abundance of that first essential for a writer on any subject, a deep and catholic sympathy with it, all contribute to render his books most illuminative.

It is not often realised in this country what a mountainous country Japan really is. It is true, it does not contain any great glaciated peaks. Mr. Weston tells us that he is not satisfied that any patch of old neve, which may here and there

be found in summer, can be described as a glacier—any more than we can call the small beds of "eternal" snow on Ben Nevis glaciers. He is not even convinced that Japan ever had an ice age, such as has left obvious and recent-looking traces all over our own Highlands. Japanese volcanoes are well known, some of them by no means extinct, as many disasters, some quite recent, prove clearly. "The" mountain, of course, of Japan to a foreigner is Fuji-San, a practically extinct volcano, 12,400 feet high. Like volcanoes in general, it offers no actual climbing, though the ascent can be dangerous in bad weather or deep snow. The ascent is nowadays greatly facilitated by the construction of a good path, and of numerous rest-huts, and is made annually by over 15,000 people. The bulk of these do not, of course, make this or other ascents for pleasure, or sport, or even consciously for health or exercise. As a Japanese diplomat once remarked, "We are a serious people; we climb as a religious duty." Japanese mountaineering, in the ancient sense, resembles the pilgrimages of the Mohammedans to Mecca, of the palmers to Jerusalem, of the English folk of Chaucer to Canterbury, of the Thibetans to the glaciers of the Himalayas. In Japan, the mountains are considered as the especial thrones of the gods and spirits of Nature, and the physical, mental, and spiritual rewards and benefits earned by the toilers upwards are thought to be bestowed by their good-will.

Besides the chapters dealing with mountaineering, Mr. Weston has others entitled "The Human Interest," "The Making of the Soldier in Modern Japan," "Sports and Pastimes," "Rural Japan all the Year Round," and one "The Greece of the Far East," devoted to a comparison between Ancient Greece and Modern Japan.

Mr. Weston is not only an eminent mountaineer—he is an old member of the Alpine Club, the "father" of modern Japanese mountaineering, and the first honorary member of the Alpine Club of Japan—he is also a keen observer, a vivid and interesting describer, and is possessed of that saving grace of the traveller, a keen sense of humour. He gives a number of amusing anecdotes dealing with the people and conditions of life in the mountains, and some quaint instances of Japanese-English. Lest these should induce in us a feeling of superiority, he adds, rather slyly, an English example of an unconscious *double entendre*. The Japanese announcement, taken from a guide-book, asserts that the chief occupation of the inhabitants is to "feed peacefully upon pilgrims." The English (Surrey) analogue appeared on the notice board of a chapel—"Saturday night, at 8 p.m., the annual potatoe-pie supper will be held. Subject of the sermon on Sunday morning, 'A night of horror.'"

For any one visiting Japan, or interested in the geography, scenery or people, Mr. Weston's volume will be found invaluable.

The Arab of Mesopotamia: Basrah. Published by the Superintendent, Government Press, 1918. *Price* Re. 1.

The preface states that "this pamphlet consists of a series of brief essays on subjects relating to Mesopotamia written, during 1916, by persons with special knowledge of the subjects dealt with." Bound up with these is a series of articles on Asiatic Turkey by Miss Gertrude Lowthian Bell, "written at the request of the War Office during June and July 1917." The whole volume consists of a little over 200 duodecimo pages. It is an admirable compendium which one can hardly praise too highly. If this is an earnest of the spirit in which Mesopotamia is to be ruled, it will become a real Arabia Felix. The various writers are obviously imbued with a sympathetic interest in the inhabi-

tants, which the plain, straightforward style—somewhat reminiscent of the official report—of the first part quite fails to conceal. Miss Bell's half of the book, as might be expected, contains more colour, more of the personal note. Her sympathies are so catholic that she shows a soft side, as we say, with an admixture of good-natured contempt, even to the "kindly ineffectual Turk." The only blemishes in the book are the considerable number of printers' errors in the second part, and the map of Mesopotamia which forms the frontispiece. The latter would have been improved if no attempt had been made to represent mountains. The spelling of names also is quite different from that of the text. It will take time for one to become accustomed to this new spelling. "Quran," for example, and "Qurna" have a strange look. We hope that this book will be widely circulated: indeed it should be read and digested by all who are interested in the future, not only of Turks and Arabs, Kurds and Armenians, but of the British Empire.

Eastern Exploration Past and Present. Lectures at the Royal Institution by W. M. Flinders Petrie, Hon. D.C.L., LL.D., F.R.S., F.B.A. London: Constable and Co., Ltd., 1918. 2*s.* 6*d. net.*

The East dealt with in this volume is Palestine and Mesopotamia; hitherto we have associated Dr. Flinders Petrie's name with the study of the ancient life of Egypt. This is a war book, for the war has opened up a new outlook for the student of ancient Palestine and Mesopotamia. The war has created new possibilities of research, or, as we learn, of the *destruction* and disappearance of ancient monuments. The very prosperity and openness, henceforward, of these lands—now passing presumably under British rule—will "promote the destruction of past ages of civilisation," says Dr. Flinders Petrie. One can easily understand how this should be. We cannot expect the native owners of sites rich in valuable antiquities to be inspired by enthusiasm for historical evidence. Prosperous settlers will find the old buildings convenient as quarries, or the wealthy curiosity-hunter or amateur collector comes along, and the treasures are sold or even broken up to suit the special demands of the buyer. Dr. Flinders Petrie tells us that "the cemeteries of the Hittite region" in Eastern and South-Eastern Asia Minor "have been greatly wrecked by the natives, after they were exposed in cutting the Baghdad Railway." Regarding the remedy, Dr. Flinders Petrie is clear that the policy hitherto followed of declaring such antiquarian treasures to be Government property, not to be sold except by express permission, has been and will be absolutely inefficacious. He is equally positive that a reversal of the policy will effect what he wants. A law that all such historical finds will be valued and paid for by the Government would, he thinks, suffice to prevent their dispersal and destruction.

Regarding the exploration of Jerusalem, the pronouncement of the "exploration" specialist is: "Much the best course for practical and for historical reasons would be to start a modern suburb and then clear ancient Jerusalem down to the Solomonic town."

Over and above the exposition of the professed theme of the lectures many striking generalisations of universal interest are to be found in the volume. There is, for example, bearing upon the proverbial character of the Jew, the following: "The Semitic Jew showed no special trading capacity until after his captivity in Babylon." Again, there is this about the Periclean age in Greece: In the multitude of highly civilised Persian captives detained as slaves in Greece after the defeat of Xerxes, "we see the reason for the sudden burst of advance which

Greece made in the fifty years from the Persian war to the Peloponnesian war, including all the greatest architecture, sculpture, and philosophy." This also about the history of arithmetic: "Sumer is the homeland of the trading system. Every clock-face descends from the astronomy of the Sumerian, who divided the day by twelve, as the year is divided in twelve months. Every compass card also shows the division by 360°, copied from the days in the year. The Sumerian tradition could not even be broken up by the fanatic decimalisation under the French Republic; and it will be a troublesome time for our money system if we abandon a division by six and twelve, founded in Nature, in favour of the artificiality of pure decimals."

Beyond the general plea for the necessity of further exploration without delay, and of some better system of preservation of historical relics, beyond also the very striking interspersed generalisations, the volume is one for the specialist rather than the general reader. For the former it is important to know how much remains to be done, for the latter it is more necessary to be informed what has already been accomplished and what historical conclusions have been reached. To many general readers, however, the very enumeration of the successive civilisations or racial influences which have in turn affected the two regions here dealt with is in itself a lesson in true historical perspective, of vital importance for the intelligent reading of any period of the history of these regions.

AFRICA.

Through Egypt in War Time. By Martin S. Briggs. London: T. Fisher Unwin, 1918. *Price* 21*s. net.*

This is a description of the life and impressions of a non-combatant officer, an architect by profession, who was on military service at the various camps in Egypt in 1916-18. The author was able to see much country that is seldom visited by travellers, and took part in the famous expedition to the Siwa Oasis, the home of the Senussi, where fighting took place chiefly in the winter of 1915 and spring months of 1916. He gives an interesting description of this remote community of 4000 people in the Libyan desert, and illustrates the text with beautiful photographs and drawings. The oases of Kharga and Baharia were also visited. These "islands" in the sea of sand depend for their existence on the good springs of fresh water that issue from the rocky floor of the desert. But the driving sand of the desert, and the suffocating storms of dust, the heat and the mosquitoes make these remote settlements anything but attractive to ordinary human beings, particularly in the hot months, when the author's visit was made.

Chapter III. describes the Fayyum, an important part of the Nile valley, noted for its agriculture, but the temperature in the shade during May was sometimes as high as 122° F., and life was thus almost unbearable for the European in summer in that physically depressed but fertile province. The author's travels extended by the "Oldest Road in the World" to Gaza in Palestine, where fighting was in progress in the spring of 1917, and he gives a good account of his impressions and also of the ancient historical association of the classic region. Indeed, there are few parts of Egypt he did not visit and survey with the artistic eye of an architect; but, amid a host of interesting illustrations, why does he not include a few pictures of the works of the great modern builders, such as the beautiful barrages below Cairo, or the imposing dam at Assuan, that will to all time be monuments to the benefactors of Egypt, a thing that few of the ancient builders ever pretended to be? The ancient architecture is nearly all included in two categories—temples and tombs; but the vast irrigation works and barrages mark

a new stage in Egyptian history, and no true historian of the future will be able to complete the record without taking notice of these immense and imperishable marks of the British occupation—of the utilitarian and industrial period when the things that were done were not done for the glorification of any particular king or conqueror, but for the general good of the community, and for the social advancement of the toiling and hitherto oppressed masses that have been freed from the tyrant's rule by the very army with which the author was associated.

GENERAL.

The Strategic Geography of the Great Powers. By Vaughan Cornish, D.Sc., Fellow of the Royal Geographical, Geological, and Chemical Societies, and of the Royal Colonial Institute. London: George Philip and Son, Ltd., 1918. *Price* 2*s. net.*

This little volume, based upon a lecture delivered in 1917 to Naval and Military Officers at various centres, although primarily intended for the instruction of such, as belligerents, could not have appeared at a more opportune moment for the instruction of the general public. Now that the war is over, and the attention of all is turned to the forthcoming Peace Treaty, it behoves every man who is interested in the preservation of the future peace of the world to make himself acquainted with the fundamental conditions that must be observed to secure a firm foundation of an abiding peace. Although methods and means of making war have been revolutionised, the main lines of strategy are unchanged, because Nature represented by geographical conditions lays down, now as heretofore, the main avenues of movement. In this book the author reviews these geographical conditions, describes and compares for each state the bases from which it derives its men and material, and the communications by which they are concentrated, special attention being paid to focal points and to foreign positions flanking the communications. The most striking chapter is that dealing with the British Empire, which reveals with startling clearness the vital necessity for our national existence of the maintenance of a strong fleet, and should dispel any hesitation about future policy on the part of many who feel a certain uneasiness in regard to that vague expression "freedom of the seas." This book is to be commended to the attention of all interested in the future of their own country and in the peace of the world, and the study of such a book might well be made compulsory on all politicians and statesmen entrusted with the future destinies of the nations.

Secrets of the Bosphorus. By Henry Morgenthau. London: Hutchinson, 1918. *Price* 8*s.* 6*d. net.*

In this historically valuable book the author, who was American Ambassador at Constantinople from 1913 to 1916, describes his diplomatic duel with Baron Wangenheim, the German Ambassador, who was sent to Constantinople with a single purpose, to secure "the success of the Kaiser's conspiracy for world domination." Wangenheim "believed that should he succeed in accomplishing this task, he would reap the reward which for years had represented his final goal—the Chancellorship of the Empire." The author considers he would do American politicians of the worst class an injustice to compare them with the Turkish Committee of Union and Progress led by Enver and Talaat. Nothing was too bad for miscreants of this type, whether it was shooting Nazim Pacha, Minister of War, in his council chamber, or issuing orders for the wholesale massacre of hapless Armenians. "Enver, the Iago of the Turkish conspiracy, became early in January 1914 Minister of War, at the age of 32. He was devoted to Germany, and had

spent a considerable time in Berlin as a military attaché. He spoke German fluently, and was more a German than a Turk. He allowed scores of German officers to hold important commands and drill the Turkish troops daily. In August 1914 the Turkish army was mobilised by orders from Berlin. Wangenheim told the author that the Kaiser had summoned him and other German Ambassadors to Potsdam for a meeting on 5th July 1914, at which the Kaiser asked each Ambassador in turn, "Are you ready for war?" Thereafter he left for Norway on his yacht. Yet the Kaiser now denies that he knew anything of the coming of war! On 22nd July the ultimatum to Serbia was sent, on 1st August Germany declared war on Russia and invaded Luxembourg, and on 4th August she was at war with France and Britain and entered Belgium next day. The author did his best for the unfortunate Armenians, but Wangenheim refused to help. Leaving Constantinople in February 1916, the author found the atmosphere of Berlin exceedingly anti-American, and that the Germans were not in the least sorry for the sinking of the *Lusitania*. There are 19 illustrations in the book, including portraits of the German and Bulgarian Ambassadors, and of the infamous Enver and Talaat, now fugitives from justice.

Seaways of the Empire: Notes on the Geography of Transport. By A. J. Sargent, M.A., Professor of Commerce in the University of London. London: A. and C. Black, Ltd., 1918. *Price 7s. 6d. net.*

This book may be regarded as a foundation of a system of maritime commercial geography. It looks upon the land from the sea side, and on the sea as consisting of a series of highways along which move ships in larger or smaller processions. British world trade is considered under the heading of regions—South Africa, Australasia, India and the Far East, North and South America, the Mediterranean and the Black Sea, and the North Sea and the Baltic. There is also an excellent chapter on Suez and Panama. In the preface Professor Sargent says: "It is intended to raise questions, not to solve them; to suggest lines of investigation, not to follow them out to their conclusions." The book certainly provides a vast array of facts, set out in most attractive fashion, and of the many problems raised some are followed perseveringly through intricate byways to a convincing and fascinating conclusion. For example, about one million tons of shipping carry cargo to South Africa annually, but only 650,000 tons appear to return. What happens to the surplus? Where are the lost ships? The solution is to be found in the fact that some ships do not return direct, but possibly load up with coal at Durban, proceed to India, and take in there a cargo for home. From the chapter on India we learn that Great Britain sends to her much less than she receives, since so many ships go to India from South Africa and Australia to load up there with return cargoes. We have indicated in a sketchy way the scope of this valuable work. It is to be strongly recommended to the student, and even the general reader, if interested in imperial trade, will find much to increase his knowledge and broaden his views. The maps illustrate the movements of shipping along the various routes by a device enabling the amounts to be calculated according to a scale, while diagrams indicate the tonnage, British and foreign, employed in the regions dealt with. There is an adequate index.

Handbook of Travel. Prepared by the Harvard Travellers' Club. Cambridge: Harvard University Press, 1917. *Price* $2.50.

This may be described as an American version of *Hints to Travellers*. It consists of 544 pages, printed on thin paper, compact, and easily handled. Each

section has been written by an expert. For example, Mr. Howard Palmer deals with Mountain Climbing, Dr. Hamilton Rice with Traverse Surveys in Tropical South America, Professor Davies with Geography and Geology, and Mr. Robert De Courcy Ward with Meteorological Observations. Appended to most sections is a list of reference books, and there is a copious and adequate index. The longest chapter is that on "Determining Positions by Astronomical Observations," which includes 45 pages of logarithmic tables. The object of the Harvard Travellers' Club is "to promote intelligent travel and exploration." To further that purpose this book was prepared first by a committee with Professor W. M. Davies as chief editor, and latterly by Mr. Glover M. Allen. All parties are to be congratulated upon the production of a work which cannot fail to promote the end in view, and which contains much of interest for the general reader. The trained explorer will find this a handy book of reference, and the ordinary traveller, whether globe-trotting or camping out in the wilds, may with advantage consult several of its sections, and so heighten his enjoyment. It is perhaps a little unfortunate that *Hints to Travellers*, which, we take it, is the original of all such productions, is referred to only two or three times in the text, and not mentioned at all in the index.

La Face de la Terre. Par Ed. Suess. Traduit avec l'autorisation de l'auteur et annoté sous la direction de Emmanuel de Margerie. Tome iii., 4e. partie (fin). Avec un épilogue par Pierre Termier. 2 cartes en couleur, 3 planches, et 115 figures, dont 90 executées specialement pour l'édition française. Paris: Armand Colin, 1918. *Price* 25 *fr.* + 20% *increase.*

This final instalment of the French version of Suess' great work includes both the end of vol. iii. and the index and tables of contents for the whole. Dated 1918, it has evidently been long delayed in the press, for M. Termier's epilogue is dated Dec. 1915, and he speaks then of the completion of Prof. de Margerie's labours. In an eloquent passage also he describes the peaceful death, in April 1914, of Prof. Suess, adding: "Beaucoup penseront avec moi qu'il a bien fait de mourir, dans ce printemps insoucieux, avant-coureur d'un été de massacres." He goes on to pay an enthusiastic tribute alike to Suess' character and to his intellectual greatness, and he repeats that he did well to die before the period when the face of the earth was ravaged and stained with blood, and the old international friendships broken by the erection of an insuperable barrier. His own contribution emphasises the value of internationalism in science, for he makes clear that Eduard Suess and Marcel Bertrand mutually influenced each other to a very marked extent, while both played an essential part in the revival of geology which took place in the last years of the nineteenth century.

M. Termier pays also a tribute to Prof. de Margerie's work as translator. As readers of the previous volumes will remember, the latter has not been content merely to supervise the translation. He has added a number of additional notes and figures which greatly enhance the value of the work. An excellent portrait of Prof. Suess forms a suitable frontispiece to the present part.

BOOKS RECEIVED.

In and about Palestine with Notebook and Camera. By Alfred Forder. Crown 8vo. Pp. 191. London: Religious Tract Society, 1919. *Price* 3*s.* 6*d. net.*

A Modern Pilgrim in Mecca. By Major A. J. B. Wavell, M.C. With an Introduction by Major Leonard Darwin. Crown 8vo. Pp. xii + 232. London: Constable and Co., 1918. New Edition. *Price 2s. 6d. net.*

The Geography of Europe. A Presentation of some Aspects of European Geography for the Use of Members of the Students' Army Training Corps. Edited by Ellsworth Huntington and Herbert E. Gregory. Royal small 8vo. Pp. 95. New Haven: Yale University Press, 1918. *Price 2s. 6d. net.*

The Book of Duarte Barbosa. An Account of the Countries bordering on the Indian Ocean and their Inhabitants, written by Duarte Barbosa, and completed about the year 1518 A.D. Vol. I., Series II. Vol. xliv. By Mansel Longworth. Dames. Royal small 8vo. Pp. lxxxv + 238. London: Hakluyt Society, 1918.

Bulgaria: Problems and Politics. By George Clenton Logio. Crown 8vo. Pp. vii + 285. London: Wm. Heinemann, 1919. *Price 10s. net.*

Commercial Russia. By Wm. Henry Beable. Demy 8vo. Pp. 278. London: Constable and Co., 1918. *Price 10s. 6d. net.*

England and Palestine. Essays towards the Restoration of the Jewish State. By Herbert Sidebotham. Crown 8vo. Pp. xi + 259. London: Constable and Co., 1918. *Price 6s. net.*

The New Eastern Europe. By Ralph Butler. Royal small 8vo. Pp. vi + 176. London: Longmans, Green and Co., 1919. *Price 10s. 6d. net.*

The Norseman's Route from Greenland to Wineland. By H. P. Steensby, Ph.D. Medium 8vo. Pp. 109. Copenhagen: Henrik Forlag, 1918.

The Countries and Tribes of the Persian Gulf. Two Volumes. By Colonel S. B. Miles. Medium 8vo. Pp. 643. London: Harrison and Sons, 1919. *Price £1, 11s. 6d. net the two volumes.*

The New Hazell Annual and Almanack for the Year 1919. By T. A. Ingram, M.A., LL.D. Crown 8vo. Pp. liv + 996. London: Henry Frowde and Hodder and Stoughton, 1919. *Price 6s. net.*

Sport and Science on the Sino-Mongolian Frontier. By Arthur de Carle Sowerby, F.Z.S., F.R.G.S. Demy 8vo. Pp. xvi + 295. London: Andrew Melrose, Ltd., 1918. *Price 12s. 6d. net.*

Scenes from Italy's War. By G. M. Trevelyan. With Frontispiece and Twelve Maps. Demy 8vo. Pp. 240. London: T. C. and E. C. Jack, Ltd., 1919. *Price 10s. 6d. net.*

The Development of the United States from Colonies to a World Power. By Max Farrand. With a Preface by Viscount Bryce. Demy 8vo. Pp. 311. London: T. C. and E. C. Jack, Ltd., 1919. *Price 10s. 6d. net.*

Records of the Survey of India. Vol. xi. Annual Reports, 1916-17. Dehra Dun, 1918. *Price 5s. 4d.*

Report on the Administration of Delhi Province, 1917-18. Delhi, 1919. *Price 2s.*

Railways in India. Administration Report for 1917-18. Simla, 1918. *Price 2s. 3d.*

Report on the Administration of Burma, 1917-18. Rangoon, 1919. *Price 3s. 9d.*

Official Year Book of New South Wales. By John B. Trivett, F.R.A.S., F.S.S. Sydney, 1918. *Price 2s 6d.*

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

KINGSTON-UPON-HULL: A STUDY IN PORT DEVELOPMENT.

By Captain RODWELL JONES, Leeds University.

(*With Sketch-Maps.*)

WE gain a useful conception of a town by regarding it as a living organism, capable of growth and decay, and its development as being affected as much by its geographical environment—favourable or otherwise—as by the energy, originality, and foresight of its inhabitants. Such a conception of a town has become a commonplace of modern geography, but to make it more completely fruitful we must press our comparison of town and organism a stage further—in that both, in their development, are subject to the competition of units like to themselves, and in that the requirements of both vary at different stages of their growth.

It is in the light of such a comparison that we will examine the geographical environment which has conditioned the evolution of the port of Kingston-upon-Hull.

We will first remind ourselves of the salient geographical features of the hinterland of the port, treating them in very broad outline and mentioning only such details as ultimately affect or have affected the port itself.

The Humber Estuary (Fig. 1) is the outlet of the Trent and Ouse catchment basin (*i.e.* of one-sixth the area of England and Wales), and in a very special sense this basin was in earlier times the hinterland of the port. Up to the natural gateway, cut by the estuary through the west-facing chalk scarp in the neighbourhood of North Ferriby, the Humber never has a width of less than one mile, and its deep-water channel swings to the marked concavities where now are situated the

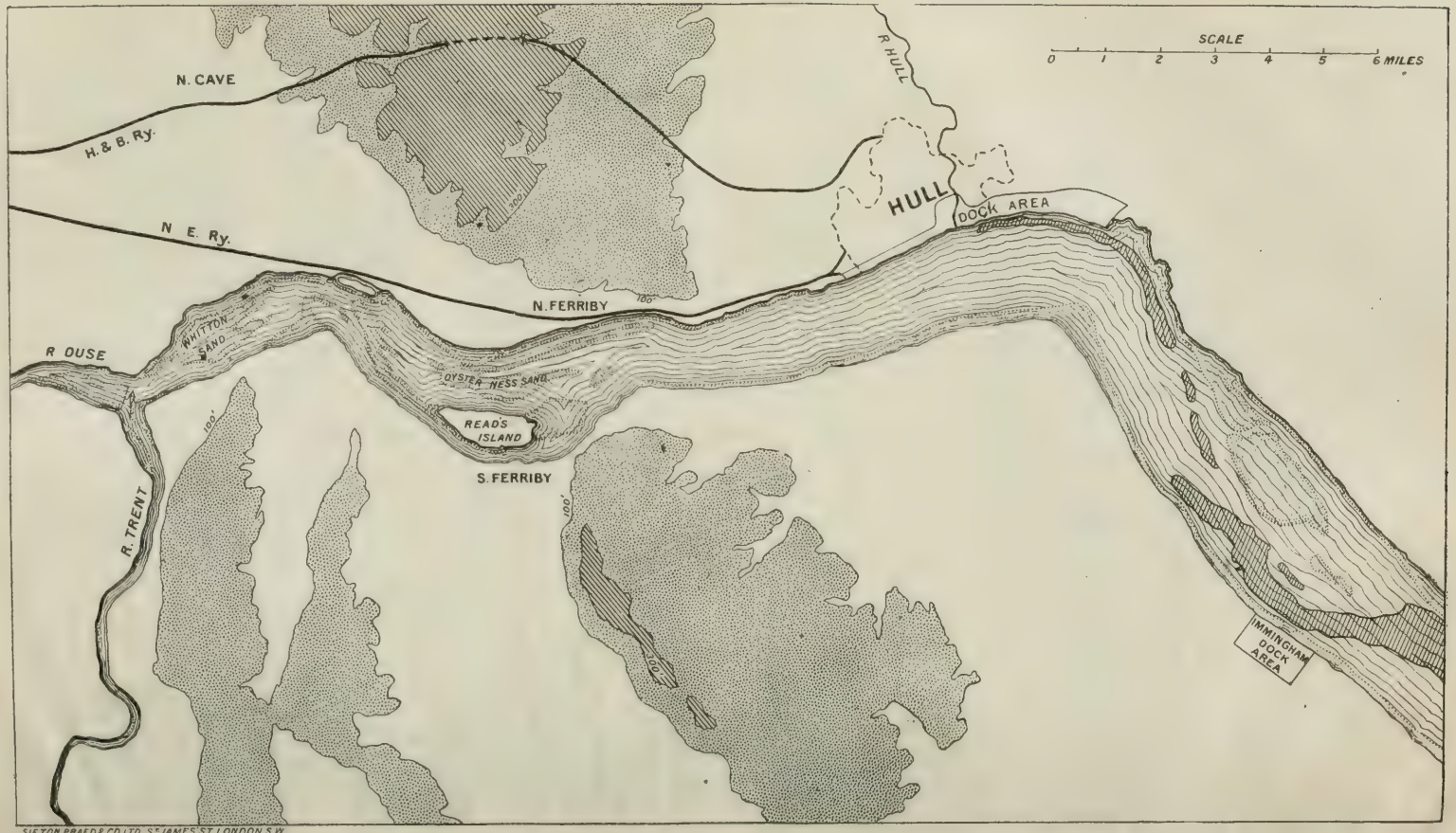

FIG. 1.—The Humber Estuary. The oblique shading below Hull shows the position of the 30-foot channel.

ports of Hull and Immingham. The tidal range is very considerable,[1] and, apart from these two places, low water usually reveals great stretches of sandbank, which have always rendered localities on the estuary side inaccessible to shipping.

On such wide estuaries, with their big tidal range, strong tidal currents (3 to 4½ knots at Hull), and lack of shelter, early settlement dependent in any way on shipping would only be possible where the entrance of some minor stream gave the necessary channel of approach and shelter from storms. Such conditions led to the little shipping settlements of Hedon, of Beverley,[2] and of Hull itself.

First Stage of Port Development.—A plan of Hull in the fourteenth century in the British Museum shows a chain-guarded harbour formed by the river Hull just where it enters the Humber proper, and also the Hull side wharves, the old walls and the moat—a cut developed from an old stream, and joining in a crescent the river Hull to the Humber. The citadel offered protection from the river side, and in those days there was still room within the walls for many gardens.

In the earliest stage of settlement Hull was merely a place of shelter, the Wyk or harbour of the Danes. So much of the land quite near to the town was marshy, and Holderness was generally so isolated by the Yorkshire moors and wolds, that Hull never had much trade overland until railway development. In its earliest stages it had to compete with the seaports of Lincoln (*via* the then old Fosse), Doncaster, about the limit of the navigation of the Don, and York, near that of the Ouse; and also of Selby and Gainsborough, lower down the Ouse and Trent respectively. But very early it derived importance from the fact that even the small ships of those times were often unable to reach the river ports proper, though these could be attained by river craft with goods which had been transhipped at Hull.

Second Stage of Port Development.—Thus we are brought to the second stage of the development of the port, in which it became the chief point of transhipment as between river and ocean craft. Before dealing further with this aspect of the port, let us consider the geographical conditions which made such development possible. Above the junction of the river Hull and the Humber, the estuary narrows considerably to the natural gateway through the chalk ridge, which is plainly defined

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[1] About 19 feet at Hull, and 19 feet 6 inches at Immingham.

[2] *Notes on Beverley.*—The river Hull, a tidal stream, is navigable some distance above Hull town, and it is only in accordance with the general order of port development that we should find the older settlement at or about the limit of navigation. From the ninth to the twelfth centuries Beverley (Fig. 3) was much more important than Hull. It was the port of Holderness, but without river improvement far in advance of anything the times could offer, it could not become the port of the Trent and Ouse basin as was possible in the case of Hull. The town itself is situated on the chalk about one mile from the marshy surroundings of the river Hull, with which it is connected by a canal—the Beverley Beck—opened in the fourteenth century after the weirs which had been allowed to obstruct navigation on the river Hull had been removed.

We shall see that the river Hull, for the two miles in which it flows through the city, is a centre of very great activity, but above this it is to-day chiefly important as providing a means whereby the very large number of trawlers built at Beverley are floated to Hull.

right down to the water's edge at North and South Ferriby. The consequent constriction of the estuary (one mile here in width), together with the inconstant relation between the flood times of the Ouse and Trent, have been instrumental in the formation of a large number of banks—*e.g.* Whitton Sand, Oyster Ness Sand, and Read's Island. Just above Whitton Sand the Trent joins the Ouse, which runs from Selby almost due east to this point with only the wide bendings of a tidal river. The land north and south of this stretch is very low-lying, and much has been reclaimed under the direction of Dutch engineers.

Exceptions to the complete evenness of the Ouse plain are the morainic deposits, notably the great crescent passing through York, and, secondly, the isolated outcrops of older rock from underneath the alluvial deposits at Crowle, Thorn, Snaith, etc., where the consequent slight rise of level above marshy surroundings probably accounted for early settlement at these places.

But, ignoring details, the salient fact is that just above the junction of Trent and Ouse we enter a great plain extending some forty miles north-west to Boroughbridge, the limit of navigation on the Ure, and sixty miles to Nottingham in the south.

It is sharply contained on the east by the Oolitic and chalk scarps revealed in the Cleveland Hills, Yorkshire Wolds, and Lincoln Edge—hilly areas which forbid easy access to the sea save by the estuary itself; while on the west the many south-east flowing tributaries were never navigable above the low scarp of magnesian limestone which runs from north to south through Yorkshire and Nottinghamshire.

Light will be thrown on the difficulties of early road traffic, and the consequent importance of river navigation, circuitous and uncertain though it was, if we consider some of the well-established trade-routes which centred on Hull in pre-canal days. The considerable towns of Gainsborough, Bawtry, Lincoln, Nottingham, Selby, York, Tadcaster, and Boroughbridge traded naturally enough by river route with Hull, but it is with some surprise that we learn of large quantities of goods from Chester and Lancashire, in their journey to London, being brought to the Trent by pack-horse as far as Burton, and thence by river for transhipment at Hull. Or, again, we may instance the heavy traffic between the Sheffield district and London, which was to a considerable extent maintained by pack-horse from Sheffield to Bawtry, the one-time river port on the Idle, and thence by the Trent for shipment at Hull. In the second stage of its growth, then, we see Hull the natural collecting and distributing centre for the river-side towns of the fertile Trent and Ouse plain, and for industrial districts at no great distance from parts of this navigable system.

Third Stage of Port Development.—The localising of industries in positions specially favourable to production, which was a feature in the change from cottage to factory conditions, and from hand to power production, involved and was dependent upon increasing transport facilities. It was the provision of such facilities in Yorkshire, under the pressure of a growing industrialisation, which influenced the growth of Hull in its third stage.

The upper portions of the Ouse tributaries—that is to say, where they cross the carboniferous limestone, millstone grit, and coal measures—have a steep gradient, and they were extensively used for power-mills before the steam-engine had been rendered practicable. This was

FIG. 2.—The Trent-Ouse Plain and its marginal uplands.

notably the case in the Sheffield area for the iron industry. Again, where the Aire and Calder, the most considerable of the Ouse tributaries, cross the Pennine uplands, the limestone has not been exposed, as is the case north and south of this area, and, consequently, the upper streams of this basin supplied not only power but plentiful soft water, two important factors in the settlement there of the West Riding woollen industry. Much might be said on these heads, but it is only

necessary to point out now that the later use of steam power in these industries, though it withdrew the centres of production farther down the valleys, and fastened them on the coal field proper, yet left them in the main above the limits of navigation, and therefore cut off from direct water communication with the sea.

Now bear in mind the fact that extensive scientific road-making hardly preceded the railway era, and that the badly made, badly repaired, parochially managed roads of the seventeenth and eighteenth centuries were quite unsuited to the rapid growth of traffic of this period, and we may realise what anxiety there was to connect the West Riding centres of production to the nearest navigable points of the Ouse or of its tributaries. Thus the first considerable river improvement scheme in Yorkshire was concerned with the deepening of the Aire and Calder rivers, and with avoiding meanders by means of cuts, so that navigation might reach the industrial centres of Leeds and Wakefield, which two towns were thus connected to Hull by waterway in the very early eighteenth century. One of the main reasons for the undertaking was in order that the products of the woollen industry might more easily reach Hull for transhipment to London and the Continent.

A little later, in 1728, the improvement of the Don navigation, almost to Sheffield, brought the iron industry of that district into direct communication with Hull, and incidentally led to the decline of the Idle and Bawtry route, previously mentioned. The early improvement of the lower Aire was never satisfactory, and in 1774 an entirely artificial waterway was made from Haddesly across country to Selby, thus adding to the importance of that town.

Finally, in order to attain a more direct route to a point on the Ouse which should be navigable for ocean-going vessels, the great canal from Knottingley to Goole was built in 1826, with large docks at the latter place. Here we have an instance of a very considerable town settlement resulting immediately from an entirely artificial work.

The promoters of the cross Pennine canals made great show of the advantage which would accrue from a through water connection between Liverpool and Hull, and incidentally between the industrial areas of Lancashire and Yorkshire, mentioning very properly the differentiation of production and requirements of the two areas as a potential factor in traffic. But as a matter of fact the actual cross Pennine routes, with their stairs of locks, narrow tunnels, and great reservoirs, consequent upon increasing gradient, were much the most difficult and expensive to engineer. They were consequently built last and, hardly preceding the railways, they never had much through traffic, and carry almost nothing to-day. Such goods as these canals now bear are confined to the industrial areas some distance on either side of the summit levels.

The complete canal system converging upon the Humber is shown in Fig. 3. It has been of great importance in the development of Hull, but in looking at the map we should remember that only the Aire and Calder and South Yorkshire systems have much importance to-day.

Thus to the Trent and Ouse plain, which had naturally the most extensive navigable river system in England, were added many miles of

artificial waterways connecting the Yorkshire, Derby, and Notts coal field with the one very considerable port between the Tyne and Thames; and providing, at a period when no other such effective transport facilities existed, for the necessary exchange of agricultural and industrial products, and for the growing traffic of the West Riding with London and with continental ports.

Fourth Stage of Development.—Before dealing with the geography of

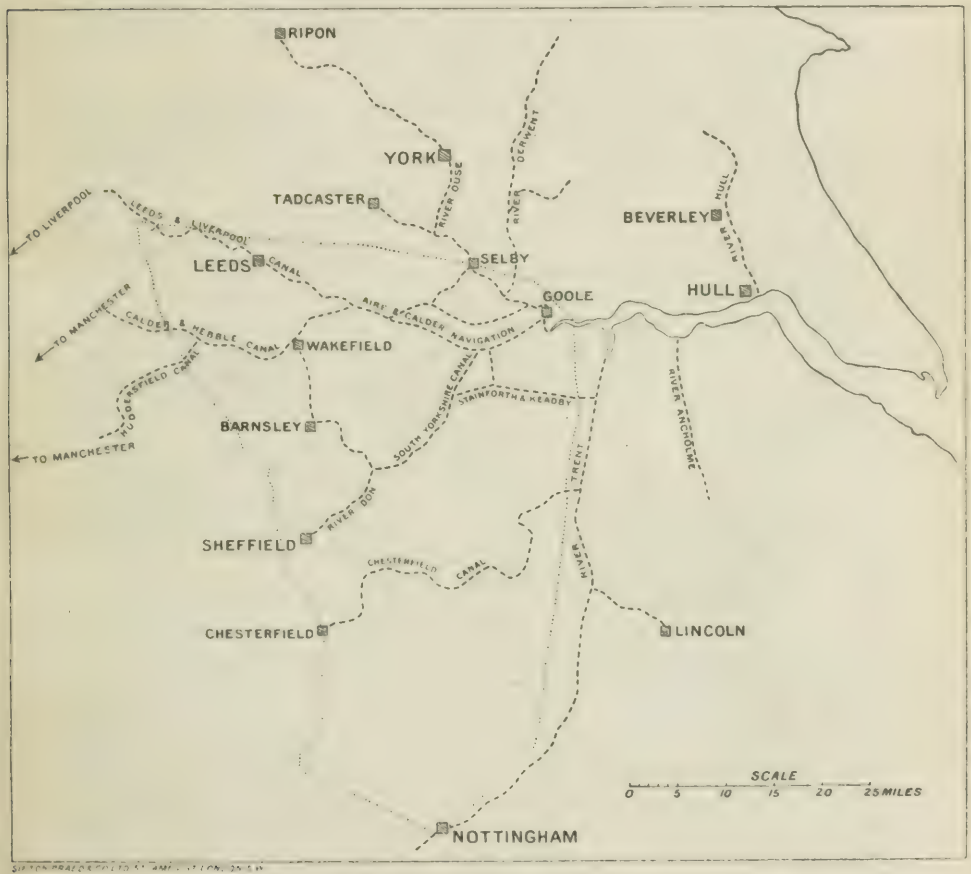


FIG. 3.—The Canal System which converges on the Humber. The estimated limit of the coalfield is shown by a dotted line.

the modern port we would note a fourth stage of development in which two great changes are evident. The increase in the size of vessels and particularly the use of iron in their construction, together with the increasing volume of trade, made it necessary to supply means whereby ships could be in harbour for considerable periods without grounding, and cargoes could be dealt with at quayside without change of level. These considerations led to the dock era in ports of tidal range.

Referring back to our note on old Hull (p. 163), we find the town confined by a crescent of moat, and this depression joining the Hull to the Humber became the site of the earliest docks. Thus the Humber Dock was opened in 1807, Princes 1827, the Railway 1846, and then, when these proved insufficient for the volume of traffic, Victoria Dock was cut out of the unoccupied low land to the south-east of the town. For further increase no land in the immediate vicinity was available, but engineering science of this date was well enough equipped to deal with the problem of a great embankment in the estuary itself, piling up the water against the town in the long line of the St. Andrew's (1883) and the Albert and William Wright (1869) Docks.

The town was now completely surrounded by docks, and the later deep-water accommodation had perforce to be constructed farther down the stream—the Alexandra (opened in 1886), and farther down again, the great new joint dock opened in 1914. This last is the joint property of the N.E.R. and Hull and Barnsley Railway Companies. The Alexandra Dock belongs to the Hull and Barnsley Railway Company, and the remaining Hull docks are the property of the N.E.R.

It is quite beyond the scope of this paper to go into reasons for the decline of British canals in competition with the railways. It will be a sufficient comment upon the importance of Hull's position if we point out that among the earliest of the disconnected unorganised fragments of track with which the railway era in this country opened, were those connecting Hull to Selby and the Industrial West Riding. Railway construction was easy here across the Ouse plain, and there was just room to push forward to Hull between the chalk scarp of Hessle and the estuary without either tunnel or serious gradient. The later Hull and Barnsley line had to seek a partial gap farther north, *via* North Cave, and even so a tunnel was necessary (Fig. 1).

The canals in agricultural areas—for example, the Market Weighton, Pocklington, and Ripon canals, and also the trans-Pennine system near the summit levels—have so suffered in competition with the railways as to be practically derelict.

Modern Trade of Hull.—So far we have endeavoured to account for the town growth of the past, relating it chiefly to the waterway connections of its hinterland. We must now indicate the leading features of its present trade and show how these can be related to its geographical position. We must call a few figures to our aid. First of all, how does Hull stand in relation to other British ports as to the value of its trade?

	Import.	Export.	Total.
1st, London, .	253·8	157·9	411·7
2nd, Liverpool, .	175·5	195·1	370·7
3rd, Hull, . .	49·8	34·7	84·6
4th, Manchester, .	35·3	20·9	56·2
5th, Glasgow, .	18·5	36·2	54·8
14th, Goole, . .	8·4	10·3	18·8

Such figures (which represent millions of pounds) are only one way,

and not a very satisfactory one, of gauging the trade of the port. They are unsatisfactory here because they neglect the great coastwise traffic enjoyed by Hull, and neglect also the greater portion of the fish traffic. Only imported fish—that is, mostly Norwegian herring—affect these figures, and further, they give insufficient indication of the immense traffic of bulky but comparatively cheap commodities, such as coal and timber and grain. Even so, Hull figures as the third port of Britain either on a value or a tonnage basis. Now let us see what the character of this trade is.

	Imports. Total £49,800,000		Exports. Total £34,700,000
Wheat, barley and maize, .	9·8	Machinery, .	4·25
Wool,[1]	2·0	Cotton goods, .	5·2
Butter, ...	3·6	Coal, . . .	3·3
Bacon, ...	1·5	Wool goods, . .	3·0
Oil (seeds), . . .	7·4	Oil, . . .	1·1

The port resembles London in the very general nature of the cargoes carried, in the excess of the imports over exports, in the large proportion which food-stuffs bear to the total value of its trade, and in the very extensive off loading into lighters. A brief table will give us a basis of comparison for the imports at some of our larger ports. (The figures, as before, are in millions of pounds.)

	London.	Liverpool.	Hull.	Manchester.
Wheat, . .	7·7	10·1	7·4	3·7
Bacon, . .	1·5	4·7	1·5	0·12
Butter, . .	7·8	0·01	3·6	0·00
Meat, . .	17·3	14·0	0·5	0·23
Oil-seed, .	3·8	1·67	7·4	0·18
Sugar, . .	7·9	4·0	1·0	1·0

The very extensive trade in butter, bacon, and sugar is carried on almost entirely with the near continental ports, and the smaller steamers concerned in this trade use chiefly the crescent of older docks. We should note that in the case of oil-seed, wheat, and timber we are dealing with quantities comparable to those imported at London and Liverpool; indeed in the case of oil-seed the import is second only to that of Marseilles. The huge timber import is mainly a result of the connections of the port with the great coal field, and the import of the pit props is little less than that at Cardiff or Hartlepool.

[1] *Note on the Raw Wool Import at Hull.* The most noteworthy anomaly in the trade of Hull is the small raw wool import. Thus—Hull 53 mill. lbs.; London 495 mill. lbs. (a very large fraction is re-exported), though by far the greater portion of the London import comes eventually to the West Riding. In this connection we must remember that London is the wool market of Europe, whereas direct import to Hull or Goole is usually only in cases where the material is actually bought by agents in Australia. This practice is growing both in the English and continental industry, and with the requisite shipping facilities we may look for increasing import at Hull. A considerable quantity of wool is brought to Hull *coastwise* from London. This does not appear, of course, in the Hull import figures.

The import of wheat and of oil-seed is related to the inland navigation which has been so constant a factor in the progress of the port.

We should remember that when little grain was imported and transport facilities were wanting, locally grown grain was milled at a vast number of water and wind-mills scattered all over the land. More recently we have subsisted very largely upon imported grain which has come overseas in large vessels to our bigger ports. Now a big port is of necessity a good distributing centre, and further, it must be a place where coal and therefore power is readily available. It is obviously more economical to distribute the flour from a comparatively few great power mills, than to distribute the imported grain to an enormous number of small mills, and thence the flour to the consumers. Thus it is that the industry is almost entirely localised at the huge mills of a few great ports or at good distributing centres in water communication with such ports. In the case of Hull, the wheat is imported as shown in the following table for 1913 :—

Americas, . .	1·6	Millions of qrs.
Karachi, . .	1·7	
Russia, . .	0·5	
Australia, . .	0·35	
Calcutta, . .	0·13	

It is brought into the deep-water docks, and thence off-loaded into the lighters which swarm in all the Hull docks, and remind one of the dependence which the port still has upon its waterway connections. The lighters take much of the grain from the docks to the great mills situated on the river Hull itself, which, though no longer the harbour proper, is crowded with barges and has both banks fully occupied for nearly two miles with flour mills, seed-crushing mills, and warehouses. Very large quantities are water-borne to the mills at Selby and York. Indeed, grain and coal are the only two important traffics on the Ouse river navigation, which is rendered unsatisfactory by shifting banks above Goole.

Mills at Tadcaster, Wakefield, Leeds, and Gainsborough receive considerable supplies by water, and the railway sendings are comparatively small. Oil-seed is in much the same case, though this commodity is not so widely distributed as wheat. The seed is sent by lighters from the deep-water docks to crushing mills on Hull side, or by water to the huge mill, probably the largest of its kind in the world, at Selby. The resulting cattle-food cake, fertiliser, and oil are widely distributed both by water and rail.

As another instance of the localising of an industry dependent upon modern conditions we may take the fish trade. The majority of Hull trawlers are big vessels, often absent for three weeks at a time, and requiring therefore large stocks of coal and ice, for the fish trade of this port is mostly concerned with the distant grounds of Iceland and the

White Sea.[1] The modern industry requires facilities for the provision of these stocks and for the repair of trawlers, and, most important of all, for the rapid distribution of the catch. Such facilities will usually only exist at a big port, and the modern industry is increasingly centred at such, and is dwindling at the older fishing settlements, which could not supply such conveniences. The St. Andrew Docks are entirely given over to this traffic, and are fully equipped with railway sidings, fish quays, coal-hoists, ice-factories, repairing slips, fish refuse works, and a box-making factory. Huge as is the figure for the Hull catch as given in the official publications, it really underestimates the interest of the port in the trade, for it neglects the great import (1·4 mill. cwts.) by fast steamer of loosely packed herring from Norwegian fiords. The curing of these at Hull is an industry in itself.

It neglects also the great quantity of fish (1·4 mill. cwts.) caught in the North Sea, by trawlers equipped and manned by Hull. The whole of this catch is taken by fast carriers to Billingsgate, and is the only fish water-borne to that market, though enormous quantities arrive by train. This is a branch of the trade quite peculiar to Hull.

Not more than a bare reference need be made to the larger geographical factors which influence our fishing industry. The shallow waters of the West European continental shelf, with its off-shooting ridge through the Faroes and Iceland, have been fishing grounds throughout history, but they were accessible from all British ports, though some obvious advantages lie with the East Coast stations. We are more concerned to point out that the equipment and resources of Hull as a great general port have enabled it with a very few other suitably equipped and situated stations to attract the greater part of the enormously increased catch of recent years, an increase which must be related to the use of the trawl, to the use of power on trawlers and drifters, and at least as much to increased facilities for rapid distribution.

The distant fishing so characteristic of Hull is nothing new to the port. Centuries ago Hull boats visited these grounds, and took the salted products to the Catholic countries of Southern Europe. This branch of the industry is represented to-day. On the flats west of St. Andrew's Dock one may see—in suitable weather—large quantities of heavily salted cod being dried for export, mainly to Mediterranean ports.

In competition with the increasing efficiency of continental stations, we may notice a very recent tendency for our trawlers to land their catches at continental ports, and our general supremacy in the traffic is evidenced by the great percentage (about three-eighths) of our total catch, which is exported (mostly herring pickled in barrels, or "Klondyked," *i.e.* loosely packed in salt and ice) to the Baltic and near continental ports.

[1] Really the entrance to the White Sea, *i.e.* the Barentz Sea. Hull trawlers visited these grounds first in 1906, and the valuable catches of plaice encouraged extensive fishing here. This reached a maximum in 1911, but there has been a serious falling off in the last few years, and fewer boats visited the ground in 1912 and 1913, for a catch of less valuable fish hardly pays for the voyage.

The following table is a quantitative index of the salient features of the fish industry at Hull :—

England and Wales Landings, 14·4 *cwts.* (*mill.*)

Of which Grimsby	3·8	In addition Hull imports
Yarmouth	1·8	1·4 (mostly herring),
Lowestoft	1·7	and Hull fleets take to
Hull	1·7	London 1·4. No other
Fleetwood	·8	station has figures
Tyne	·6	comparable to these.
Milford	·58	So Hull is really the
Swansea	·20	second fishing port.

Hull is not pre-eminently a centre of herring fisheries, as are the Scottish stations, and Yarmouth and Lowestoft, the greater portions of the catches of which are salted or cured and exported. Nevertheless the herring catch is big (about one-eighth of the total).

The greater number of trawlers engaged in East Coast fisheries are not built at Hull, where the valuable space devoted to shipyards is used in the construction of larger boats, but at the riverside yards of Beverley, Goole, and Selby, where no other class of boat is built.

The most recent development of Hull is connected with its coal export traffic. Here again figures are the briefest indication.

	(Tons 10^6)	
1913—U.K., . .	90·5	
Tyne, . .	16·3	Half the Humber ex-
Humber, . .	11·4	ports from Hull.
S. Wales, .	21·6	

Hull has not the historic connection with coal export exhibited by ports (notably Tyneside) which are situated practically on coal fields, and its importance in this direction is rather to be related to the quite recent extensive eastward development of the Yorkshire, Derby, and Notts coal field (see Fig. 3).

Over one hundred and fifty pits send coal to Hull for export, fifty of them in large quantities (25,000 tons), but actually one half is forwarded by a dozen of the latest and largest pits in the Doncaster area.

The waterways (Aire and Calder and S. Yorkshire) send a large quantity (450,000), but take little part in the big increase of recent years. *E.g.*:

	Via River.	*Via* Railway.
1902	·61	2·56
1907	·68	5·8
1912	·46	6·5

Foreign countries receive coal from Hull as shown in the following table, and, as might be expected (particularly in Germany), the coal is very generally for use near the foreign receiving port. Only a small portion is carried inland, and that usually by water.

In 10^6 tons.	1913.	
Russia,	1·5	Other countries in very small quantities. (Note low position of Mediterranean countries, France, etc., and cp. the large S. Wales export to these countries.)
Germany,	·8	
Holland,	·4	
Sweden,	·4	
S. America,	·26	
Italy,	·19	
Egypt,	·23	
France,	·31	

The docks, particularly the Alexandra, William Wright, and New Joint have all up-to-date coal shipping appliances, special attention being given to the prevention of coal breakage.

Competition for coal shipment from the Yorkshire, Derby, and Notts coal field exists at Goole, Grimsby, and Immingham.

	Export.	Coastwise.		
Hull,	4·6	1·0	=	5·6
Goole,[1]	1·3	1·4	=	2·7
Immingham,	1·8	·14	=	1·94
Grimsby,	1·2	·03	=	1·23

The building of a deep-water dock at Immingham quite especially equipped for dealing with coal as well as with general commodities was viewed with some apprehension by those with interests at Hull. The newer harbour undoubtedly has a shorter lead to the more easterly portion of the coal field, and the export there is rapidly developing, but as yet Hull figures have not been adversely affected.

In closing this brief review of the growth and present activities of the port of Hull, it is advisable to recapitulate the outstanding stages of development.

Firstly.—We saw the tiny marsh-surrounded settlement existing only because of the shelter offered by the little creek of the river Hull. At this stage, and for the requirements of the time, its situation was obviously inferior to that of such up-river ports as Gainsborough or York, and even to that of its older neighbour Beverley.

Secondly.—Very early the advantage of deep water consequent upon a position near the estuary mouth more than compensated for the disadvantages of distance from the more populous areas, and Hull became a point of transhipment for river craft trading with towns on the navigable portions of the Ouse and Trent basins. In the period immediately preceding extensive canal construction, *i.e.* in the first quarter of the eighteenth century, it is noticeable that difficulties of road transport deflected to the Trent, Ouse, and Hull water route much traffic from North Central England which would have gained London more directly by an overland route.

[1] Most of this comes by the Aire and Calder canal to Goole, and is the chief traffic of the canal. It is borne in compartment boats locally known as "Tom Puddings." These are hoisted bodily out of the water and overturned, through a spout, into the hold of the collier.

Thirdly.—A network of canals, of which the Aire and Calder was and is the most important, brought the industrial West Riding into direct water communication with Hull.

Fourthly.—The advent of deep-water ports and docks consequent upon the increasing size of carriers did not affect Hull adversely, for the port is situated at the most marked concavity of the estuary, and has natural deep water. The immediate surroundings of the city, too, were such that the engineering of at any rate the earliest docks was not a very difficult problem. Railways amplified and emphasised the lines of communication already existing, and then were instrumental in widening the hinterland of the port.

In the modern port we noted

(*a*) The effect of an industrial hinterland on the prevailing classes of traffic—the great import of food-stuffs and export of manufactured articles.

(*b*) The very considerable part which some of the waterways take in the trade of the port even to-day, particularly in the cases of wheat, oil-seed, and coal.

(*c*) The influence of the port *qua* port in localising there great milling and fishing industries.

(*d*) The extension of South Yorkshire coal field, which has caused the Humber to become an exporting area comparable in point of quantity exported to that of Tyneside or South Wales. Of this Humber shipment more than half is dealt with at Hull.

MODERN JAPAN.[1]

ACCORDING to his publishers' list this is the fourth book on subjects connected with Japan and the Far East which has come from the pen of M. Bellesort, and this one appears at an appropriate time when the question of Japan and of its future relations with European countries and peoples are of absorbing interest. The writer handles his theme with admirable French clarity and perception; and he also covers so much ground in his book that it is difficult to give a clear and concise idea of its contents within the limits of a brief article. It may be mentioned that his notes date from the time which immediately preceded the war, and that he left Japan on the same day that the Emperor sent his ultimatum to Germany. The book divides itself into four parts. The first deals with "The Heroes and the Gods," and in it "The Last of the Samurai" is embodied in the person of the late Marshal Nogi, who, after his victorious campaign against the Russians in Manchuria, was appointed by the Emperor to take charge of a

[1] *Le Nouveau Japon*, by André Bellesort. Paris: Librairie Académique Perrin, 1918. Price 3 fr. 50 c.

school for the sons and daughters of the nobles. To this task, apparently ill-suited to a soldier of his eminence, Nogi brought the same qualities of conscientious devotion to his imperial master which he had shown when leading his soldiers against the defences of Port Arthur. It will be remembered that the last act by which the veteran paid tribute to the memory of the Emperor was, after the custom of old Japan, to commit suicide by *harakiri*, and that his wife followed his example. As to these acts M. Bellesort remarks that "a certain number of Japanese intellectuals, who took good care to keep their opinions to themselves, esteemed them to be regrettable anachronisms," but, he adds, "le suicide du maréchal Nogi, qui semble exhumé des vielles annales romantiques, était, en un sens, plus actuel qu'il n'en avait l'air. Cette libation sanglante donnait un surcroit de vie à la divinité de l'Empereur."

Under the heading of "A New Religion," M. Bellesort essays to analyse the spirit of *Bushido* and its effect on the life of modern Japan. His opinion is that, in the last fifteen years, Japan, if she has not precisely worked to "*rejaponiser*" herself, has arrested the tendency to imitate Western manners, and has rather devoted her best energies to the preservation of all that is most living in her past. The word *Bushido* signifies "The Way of the Warrior." It is not only an awakening of national sentiment under the menace of foreign influence. It is at the same time, like the Mosaic Law, a theology and a moral code; and it also represents the greatest effort which Japan has made to oppose to European nations a religious institution analogous to theirs, and one which proves the superiority of Japanese morality.

Under the heading "*A Travers le Théâtre et le Roman*," M. Bellesort has an amusing account of the Comédie Française in a Japanese theatre, when *The Cid* was transmogrified into *Le Miroir d'héroisme de Kamakura*, and the unfortunate actors had to adapt both the plot and their own wardrobes to Japanese theatrical standards. Shakespeare has also been put on the boards of the Imperial Theatre at Tokio; but *Hamlet* was voted "not sufficiently modern," while *Julius Cæsar* fell flat, in spite of its murders. It appears that German modern drama finds more favour than either French or English plays, and that the *Magda* of Sudermann met with approval. As for European literature, M. Bellesort says that a few French authors are read, Guy Maupassant being the most popular among novelists, while English writers are neglected, although their language is the most widely taught; and, save perhaps Stevenson and Kipling, our great novelists are "non-existent in the eyes of the cultured Japanese." Russian literature seems to hold the first place, and there is even a Society of *Tolstoians*. "No foreign novelists respond so much to Japanese sentiment as do those of Russia. The new culture of the Japanese is not any more a product of old Japan than is Russian culture one of old Russia."

In the section headed "Europeans and Japanese," M. Bellesort has chosen, perhaps not altogether happily, for his text what he calls "*L'aventure de Lafcadio Hearn*." In this he dwells at great length—some may think at too great length—on the life of that remarkable

man, who was half Celt, half Greek, and wholly rebel in his hatred of the conventions of English and American social and religious life. The author, who made the acquaintance of Hearn in 1898, when the latter was Professor of English at the University of Tokio, is evidently an admirer both of the man and of his works. He made a pilgrimage to the home of Hearn at Matsué, on the west coast of Hondo, where he spent his happiest year in Japan, and where he found material for the best of his books. M. Bellesort's account of Hearn's old surroundings at Matsué, and of the sources where he found inspiration for his writing, is very interesting, and forms an addition to our knowledge of Hearn. It is well known that he became a naturalised Japanese, and married a Japanese wife; but, after his move to the larger world of Tokio, his sensitive nature suffered much from the jealousy of his native colleagues and students, and he died a disappointed man. Hearn's persistent tribute of praise to the ways of old Japan did not find favour with the leaders of thought in the land of his adoption, whose chief desire was for modernity. Hearn loved the old gods, the old customs, and folk-lore, and beliefs. To him the art of Japan was as much in advance of ours as was Greek art to the earliest attempts of Europe. He exclaims "it is *we* who are the barbarians. I not only think this, but I am as sure of it as I am of death!" M. Bellesort says "sa vision du Japon, qu'il nous donnera dans ses *Glimpses*, garde ce qui reste d'ombre et de buée légère dans les yeux du dormeur qui soulève ses paupières et ne distingue pas entre la réalité et son rêve." He adds, "the misfortune was that he was listened to by America, by England, and by the whole world." This latter fact helps to explain the prominence which M. Bellesort gives to the influence of Lafcadio Hearn in his study of New Japan.

Perhaps the most important part of the book is the concluding section, in which he deals with the problems of politics and of industrial life. Speaking of Socialism, the author says, "Since 1890 the doctrines of Karl Marx have spread to Japan. In 1897 trade unions had already been formed, and railwaymen had started strikes for higher wages. I think that, in her haste to overtake Europe, Japan will soon experience the same difficulties, and will be confronted with similar problems for solution." This is only to say that the industrialism which has been a plant of such rapid growth in Japan will bring similar evils in its train, and that there they are aggravated by the conditions of female and child labour, long working hours, and low wages, while all the necessities of life have become much dearer. But M. Bellesort is of opinion that the evils arising from this state of affairs are less marked than might be expected, owing to the migratory habits of the workers, while the rapid growth of population (now approaching to fifty-two millions) renders the decline in the national health from industrial conditions less apparent than it might otherwise be. The spread of socialistic doctrines is checked by rigorous Government action, and also to some extent by the poverty, indolence, and oriental resignation of the workers. Lack of space prevents us from dwelling further on the author's views of modern industrial Japan; but they are well worth attention in their

relation to the rapid growth of Japanese competition in neutral markets at home and abroad.

We should have liked to follow M. Bellesort from Japan to its new colony or province of Korea. He compresses into one pregnant chapter a vivid picture of the appalling conditions of filth and ignorance and oppression which existed in Korea up to the time when Japan got a free hand, and did something to relieve the people from the hideous misrule of their own nobles and mandarins. It is true that Japan has been much criticised by British and American missionaries and residents in Korea; and also that there was a period, after the cession of the country, when it was overrun by a crowd of hungry adventurers from Japan whose only object was to exploit the wretched people. But since then the Japanese Government seems to have made honest efforts to introduce reforms, to open up the country by roads and railways, and to provide industrial and agricultural schools, which are already bearing good fruit in the shape of improved conditions for native Koreans as well as for colonists from Japan.

In conclusion, we would draw attention to the translation made by M. Bellesort of Bertram Mitford's (Lord Redesdale) fascinating story of "The Forty-seven Ronnin," which appears at the end of the book.

J. D. M.

THE ANCIENT SEA AND LAKE BASINS OF CENTRAL ITALY.

By C. S. De Riche Preller, M.A., Ph.D., M.I.E.E., F.G.S., F.R.G.S., F.R.S.E.

(*With Maps and Diagram.*)

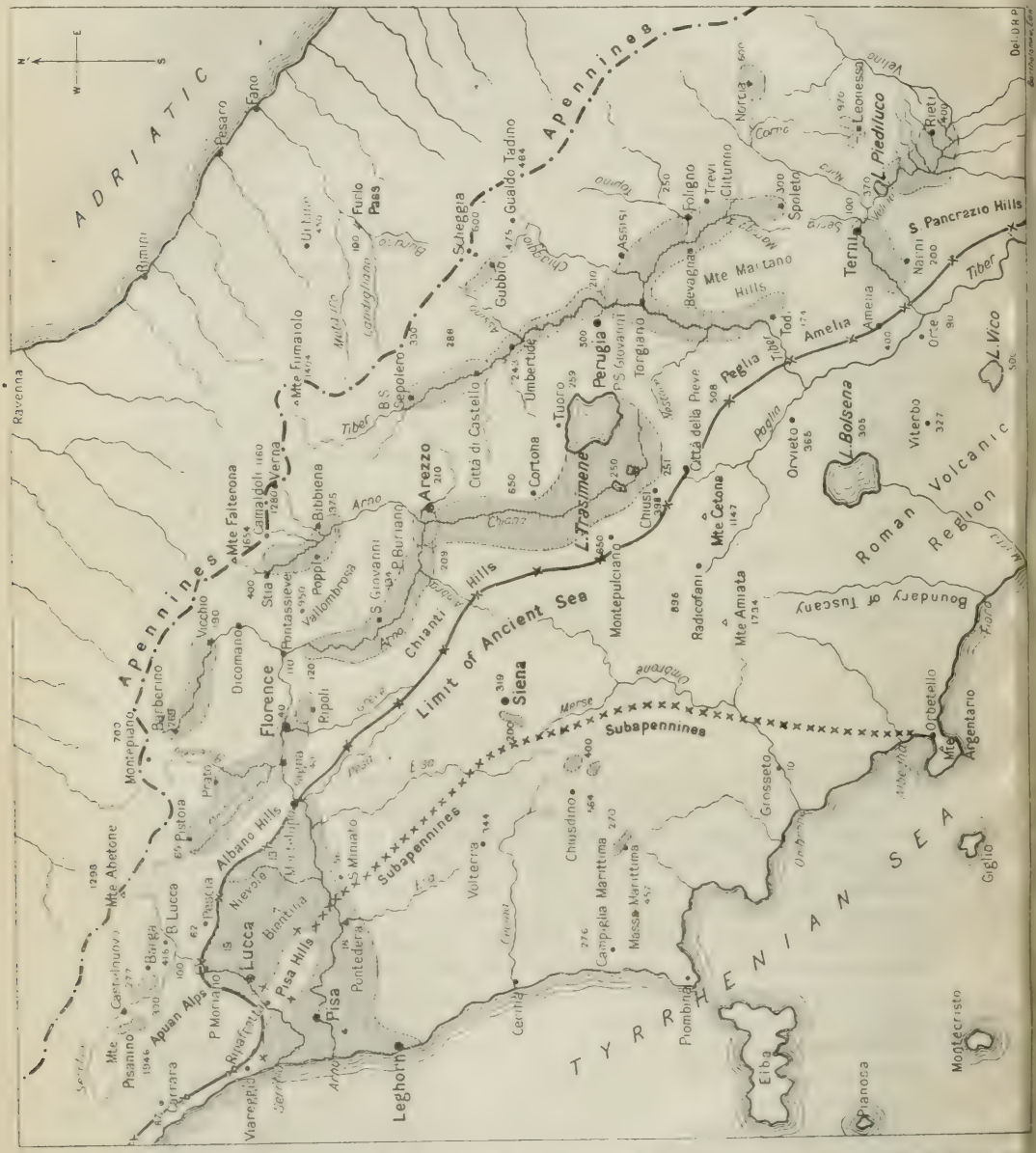
I.—General Features.

The two mountain ranges of Central Italy present the anomalous phenomenon that the Apennines, which are the backbone of the peninsula, are the younger, the Subapennines the older geological formation.[1] The Tuscan and Umbrian Apennines are composed almost entirely of Eocene rocks, the Subapennines of a Permian, Triassic, and Liassic nucleus surrounded by a Tertiary belt, and at the time of the general uprise of the Apennines in Miocene times the older groups of the Subapennines had already begun to emerge from the sea. The main axis of the Apennines runs roughly parallel to the Adriatic coast, while that of the Subapennines conforms more to the coastline of the Tyrrhenian Sea. The general direction of both ranges is north-west to south-east, which is also the original direction of the principal Tyrrhenian river systems, *i.e.*

[1] The geographical term 'Subapennine' refers (like 'Subalpine') simply to the minor elevation in respect of the principal chain, the former reaching 1000 m., the latter 2000 m. in altitude. Geologically the term is a misnomer: hence Savi's alternative designation 'Catena metallifera,' which implies, however, greater mineral wealth than the range possesses. It includes the Apuan Alps or Carrara Mountains, with its wealth, not of minerals but of marble.

HYDROGRAPHIC MAP OF THE ANCIENT SEA AND LAKE BASINS OF CENTRAL ITALY
(TUSCANY AND UMBRIA)

Fig. 1


ADRIATIC
Apennines
Pesaro
Fano
Rimini
Furlo Pass
Scheggia
Gubbio
Guado Tadino
Foligno
Trevi
Spoleto
Norcia
Leonessa
L. Piediluco
Rieti
Terni
S. Pancrazio Hills
Nami
Tiber
Mte Martano Hills
Assisi
Bevagna
Perugia
Torgiano
Città di Castello
Umbertide
Tuoro
Sepolcro
Mte Fumaiolo
Ravenna
Amelia
Orte
L. Vico
Peglia
Orvieto
L. Bolsena
Viterbo
Roman Volcanic Region
Arezzo
Cortona
L. Trasimene
Città della Pieve
Chiusi
Mte Cetona
Mte Falterona
Camaldoli
Verna
Bibbiena
Poppi
Vallombrosa
Arno
Chianti Hills
Montepulciano
Radicofani
Mte Amiata
Boundary of Tuscany
Limit of Ancient Sea
Siena
Subapennines
Mte Argentario
Orbetello
Florence
Prato
Pistoia
Mte Abetone
Albano Hills
Lucca
Pisa Hills
Pisa
Leghorn
Volterra
Chiusdino
Campiglia Marittima
Massa Marittima
Grosseto
Giglio
Elba
Pianosa
Montecristo
TYRRHENIAN SEA
Apuan Alps
Mte Pisanino
Viareggio
Carrara
Mte Castellaccio
Mte Prado
Mte Cimone
Mte Rondinaio
Mte Corchia
Mte Alpe
Mte Falco
Mte Penna
Mte Fumaiolo
Mte Catria
Mte Nerone
Mte Petrano
Mte Vettore
Mte Sibillini
Mte Terminillo
Mte Velino
Mte Gennaro
Mte Cavallo
Mte Porrino
Mte Cornicolano
Mte Soratte
Mte Cimino
Mte Vulsini
Mte Argentario
Mte Leoni
Mte Tolfa
Mte Rotondo
Mte Romano
Mte Calvo
Mte Ginestro
Mte Arsiccio
Mte Lecinaio
Mte Vitalba
Mte Aquilaia
Mte Pelato
Mte Rognosa
Mte Labbro
Mte Amiata
Mte Cetona
Mte Martano Hills
S. Pancrazio Hills
Tiber
Arno
Paglia
Chiana
Ombrone
Cecina
Serchio
Magra
Metauro
Foglia
Conca
Marecchia
Savio
Montone
Lamone
Reno
Panaro
Secchia
Enza
Taro
Trebbia
Scrivia
Tanaro
Dora Baltea
Sesia
Ticino
Adda
Oglio
Mincio
Adige
Brenta
Piave
Tagliamento
Isonzo
Velino
Nera
Corno
Turano
Salto
Aniene
Liri
Garigliano
Volturno
Sangro
Trigno
Biferno
Fortore
Ofanto
Bradano
Basento
Agri
Sinni
Crati
Neto
Tronto
Pescara

of the Tiber, the Arno, and the Serchio, while on the Adriatic versant of the Apennines the numerous, short, and mainly torrential rivers all flow in rapidly descending deep-cut valleys at right angles to the axis of that range. This striking difference between the two versants is seen in the hydrographic map[1] (Fig. 1).

The great Tertiary contraction of the earth's crust manifested itself in Central Italy not only by the raising and folding of the Apennines and Subapennines, but by the uprise of the Tyrrhenian continent which, during the Miocene and part of the Pliocene period, linked the Tuscan mainland with Corsica. In the Tuscan and Umbrian Apennines the Miocene uprise was a period of greatly attenuated sedimentary deposition, but, on the other hand, one of active erosion due to the gradual steepening of the uprising mountain flanks. This combined process of folding and erosion led in the Apennines to the splitting up of the original dome-shaped *massif* into parallel anticlinal ranges separated by the synclinal depressions or longitudinal valleys of the Tiber, Arno, and Serchio river systems. The Subapennines were, by the same process, separated into the groups of the Pisa, Leghorn, Siena, and Maremma Hills, with deep-cut valleys radiating from and intersecting these groups in all directions.

Even in that early or Miocene stage of mountain- and valley-making, Central Italy thus developed between the Tyrrhenian and the Adriatic Seas a remarkable diversity of hydrographic conditions, a diversity which was greatly enhanced in the course of the succeeding Pliocene and Pleistocene periods, characterised by equally remarkable marine-, estuarine-, and lake-formations. These three factors profoundly affected the drainage areas of the river systems, the physiography of the principal valleys, and the climatic conditions of the various parts of Tuscany and Umbria where they operated, and a synthetic survey of their evolution down to historic times—founded on the present writer's intimate knowledge of the whole region—will therefore not be without interest.

II.—The Ancient Sea and Lacustrine Expanses.

As in the Alps, in the Po Valley, and in the Northern Apennines, so also in Central Italy the Miocene uprise was, in the middle and latter part of the Pliocene period, followed by a general settlement and subsidence, during and in consequence of which the previously raised Tyrrhenian continent was partially submerged and converted into an archipelago. The Subapennines and Apennines were similarly lowered, so much so that the former were extensively invaded by the Tyrrhenian Sea, and in the latter the great longitudinal valleys, deepened by rifts and faults, were drowned and became vast lacustrine troughs. The great Pliocene marine belt of the Subapennines extended in the north from the foot of the Apennines near Lucca, throughout Western Tuscany down to Orbetello in the south, while inland it reached the range of the Albano,

[1] The map, Fig. 1, is necessarily on a very small scale. References to larger scale maps containing all the names mentioned in this paper will be given at the end of the article.

Chianti, and Montepulciano Hills which form the dividing barrier between the Subapennines and the Apennines. In this sea-covered area, 200 km. in length and 60 km. in width, only the upper parts of the older groups of hills appeared as so many islands, the whole region being thus reduced to an archipelago similar to, but more concentrated than that of Elba and the other Tyrrhenian islands.[1] East of the Subapennine divide already referred to extended the parallel, longitudinal troughs of the Arno and Tiber valleys, occupied by more or less continuous lacustrine expanses, each over 100 km. in length and 10 to 30 km. in width, while in the north the present lower Serchio valley presented a similar lacustrine expanse in contact with the sea near Lucca. Along the divide already mentioned the marine belt communicated with the fresh-water expanses of the Apennines at several points: with the Arno expanses by the Serravalle defile west of Pistoia, by the Gonfolina and the Pesa valleys west and south of Florence, and by the Ambra valley in the Chianti Hills: again, with the Tiber expanses it connected by an estuary 20 km. in width between Chiusi (400 m.) and Città della Pieve (500 m.)[2] and thence farther south near Amelia (400 m.) and Orte (90 m.).

The Pliocene period was characterised by a tropical temperature and climate, accompanied by abundant deposition of material on the floors and along the margins of the marine belt and of the lacustrine expanses to a depth of several hundred metres. These tropical conditions produced a correspondingly exuberant tropical flora and fauna of wonderful variety, whose fossil remains, found more especially in the lignite beds of that period, constitute the rich classic collections of Italian geological museums, and have been described by many distinguished Italian and other palæontologists.

The Pliocene marine and lacustrine, as well as the later Quaternary deposits, are all composed of bands or banks of gravel and conglomerate, sand and clay in descending order, the clay strata being generally the lowest of the series. The Pliocene marine deposits are often overlain by banks of marly limestone, more especially along the margin of the marine belt, as evidence of a beach formation, like the Quaternary *panchina* or limestone banks along the present Tyrrhenian littoral and of Elba. The three series of deposits are differentiated in respect of their age by their superposition, by their fossil remains characteristic of each period, and according as these are typical of marine-, estuarine-, or lake-formations, *i.e.* of salt-, brackish-, or fresh-water species. The fossiliferous lignite bands and banks occur predominantly in the clay or lowest strata, notably in sheltered bays and inlets, where vegetable and other organic

[1] From Orbetello, and inland from Chiusi, the Pliocene marine belt continued all the way down the Roman Maremma, occupying the whole coastal area between the sea and the present Tiber Valley at the foot of the Sabine Hills, which area became in Quaternary times the great volcanic region of Bolsena, Viterbo, and Bracciano and of the Albano Hills near Rome.

[2] The town of Città della Pieve, 250 m. above the valley and railway station (250 m.) opposite Chiusi, similarly perched on a hill 400 m. in altitude, was the birthplace of A. Vanucci, called Perugino, Raphael's master.

material accumulated and was gradually converted to lignite by the exclusion of air under superincumbent pressure.[1]

A peculiar feature of the marine belt deposits are the great banks of grey, blue, and yellow clay which constitute the sterile regions and jagged crags near Volterra and south of Siena to a distance of 50 km., known respectively as the *Crete*, *Volterrane*, and *Senesi*, strangely contrasting with the general verdant fertility of other Pliocene areas. The superficial area covered by the Pliocene sea in the Subapennines and the lacustrine expanses in the Apennines, as evidenced by the existing deposits,[2] may safely be computed at 11,000 and 6000 sq. km. respectively, in the aggregate at 17,000 sq. km. (6600 sq. miles), equal to fully half the combined area of Tuscany and Umbria.

The apparently anomalous phenomenon that both the Pliocene marine and lacustrine deposits, which at the time of their formation must have been at or below sea level, now appear at altitudes ranging from 0 to 1000 m. above sea level, is due to post-Pliocene earth-movements which will be referred to in the sequel.

III.—The Ancient Lake Basins.

The end of the Pliocene and the beginning of the Pleistocene or early Quaternary period witnessed a great and radical change in the atmospheric, climatic, and hydrographic conditions of Central Italy. The general subsidence of 500 to 600 metres was followed by a new uprise, during and mainly owing to which the tropical temperature of Pliocene times cooled and gradually dropped to subglacial with abundant atmospheric precipitation, corresponding, though in a milder degree, to the contemporaneous Glacial Epoch in the Alps.

It was in early Quaternary times that this uprise was, in Tuscany and Umbria, accompanied by volcanic eruptions which, at first submarine and later subaerial, produced the great trachytic cone of Monte Amiata, together with various others in South-Western Tuscany, and at about the same time, the stupendous volcanic region of the contiguous Roman Maremma. In Umbria these phenomena found an echo in minor eruptions, and more especially in seismic disturbances productive of considerable dislocations.

The earth-movements of the uprise carried the Pliocene deposits of the marine belt and the lacustrine expanses high above the levels of their original deposition at or below sea level. Thus, while in the low

[1] The lignite bands occur more especially in the clay strata of the lacustrine basins; an exception to this rule are the numerous banks of lignite up to 5 m. in depth—now being actively worked—in the Montepulciano, Sinalunga and Pienza Hills, which are embedded in the Pliocene marine and estuary deposits of that region. The other notable lignite beds in the Tuscan Subapennines, *i.e.* of Montecatini (Cecina Valley) and Murlo, south of Siena, are not Pliocene but Eocene.

[2] Many Pliocene deposits, more especially in the valleys, have been removed by posterior erosion and denudation. All along the present Tyrrhenian coastline from Leghorn southwards, as also in the Tuscan archipelago except in the flat little island of Pianosa, near Elba, the Pliocene deposits have totally disappeared, having been submerged to a great depth by the general subsidence towards the end of that period.

hills near Leghorn they are found not many metres above that level, in the inland area of the marine belt they attain altitudes of 300 m. near Volterra and Siena; 600 m. near Montepulciano, and 800, 900, and 1000 m. at Radicofani, on Monte Cetona and on Monte Amiata.[1] East of these, they drop again to 400 m. at Chiusi, to 500 and 400 m. along the hills of Città della Pieve down to those of Amelia, and to 300 and 200 m. in the Paglia Valley towards Orvieto. Similarly, in the Tiber Valley, the lacustrine deposits reach altitudes of 300 to 600 m., and in the much folded and faulted region of Spoleto, Terni, and Rieti 800 and 900 m.[2] The uprise of the land in the early Quaternary period must therefore have been from 300 to 1000 m.

Equally remarkable was the uprise in its hydrographic effects. In the Subapennines it caused the gradual recession of the sea and the formation of the extensive estuaries of the lower Arno, Cecina, and Ombrone basins, while in the Apennines each of the great lacustrine expanses of the Tiber, Arno, and Serchio Valleys slowly separated into descending chains of lake basins, traversed and interconnected by the main river of their respective drainage areas. Following the general recession of the sea, the rivers in their lower courses re-eroded their pre-Pliocene beds or eroded new ones, while in their middle and upper courses the material brought down by them and their affluents was deposited on the valley floors and banked the lake basins. Thus the river systems of Central Italy, from their sources to their estuaries, gradually adjusted themselves to the fluvio-lacustrine period which corresponds to the contemporaneous re-formation of the great river and lake systems in the Alps during and after the final retreat of the glaciers, *i.e.* at the end of the Glacial Epoch.

It is to that fluvio-lacustrine period that refers the following summary description of the ancient lake basins of Tuscany and Umbria which are shown in the hydrographic map and the longitudinal sections, Figs. 1 and 2. All these basins, now traversed by main arteries of railway communication, are of exceptional, several of them of unique, physiographic interest: moreover, each one of them is like a garden and a museum, richly endowed with natural beauty and replete at every turn with monuments of art and historical associations.

1. The Tiber Basins.

The Tiber has its sources in Mte. Fumaiolo (1408 m.) on the crestline of the Tuscan Apennines, which at this point deviates from its general direction and describes a complete semicircular curve 7 km. in diameter.[3] This belt, composed of six mountains of minor elevation (about

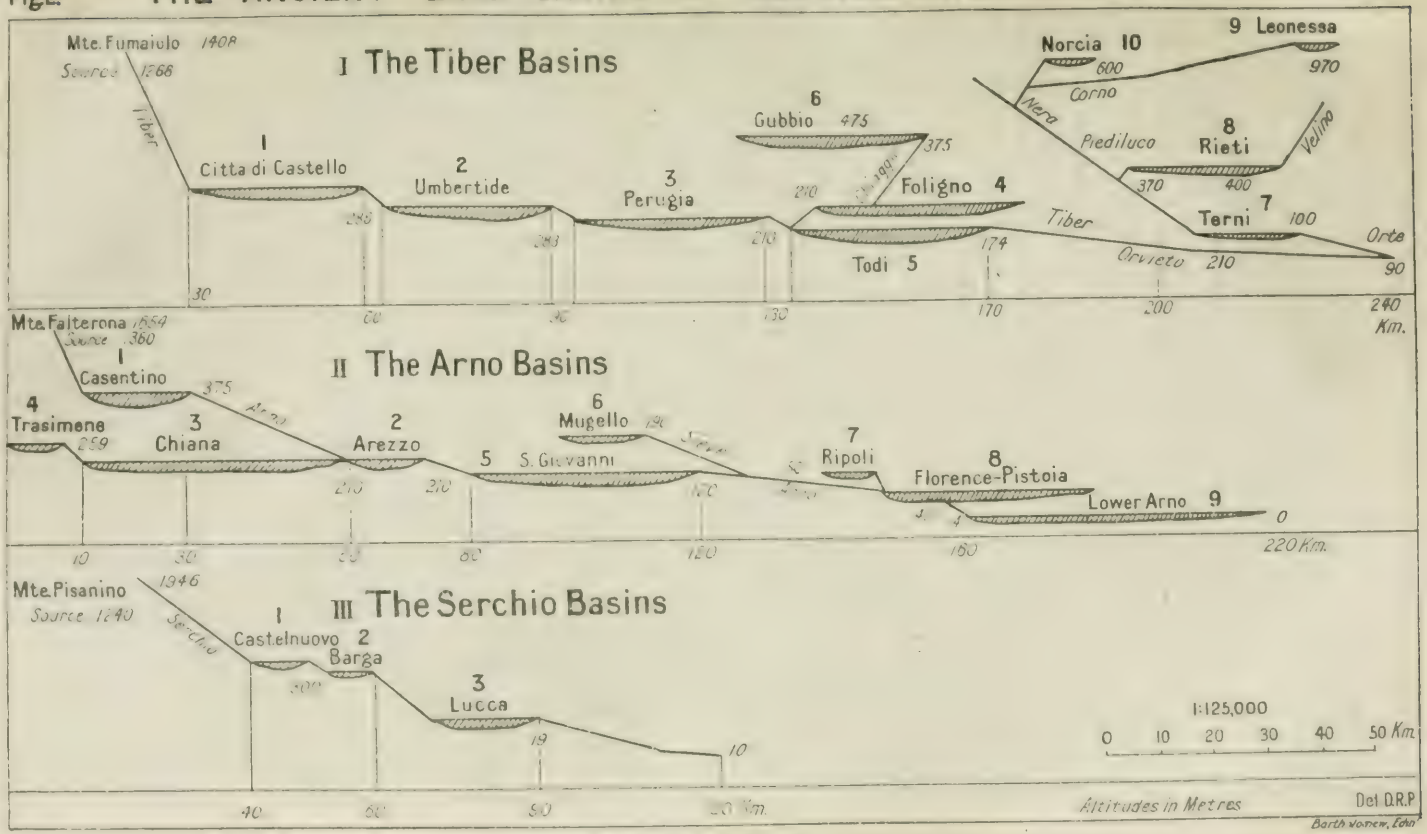
[1] The Eocene *massif* of Monte Amiata was raised athwart of the trend (north to south) of the Subapennines.

[2] Even on the flanks of the Gran Sasso d'Italia, 80 km. inland from the present Tyrrhenian coast, Pliocene deposits occur up to 600 m. altitude. They are also in evidence on the littoral and in the foothills of the Apennines on the Adriatic versant.

[3] In Dante's time the Fumaiolo group was called "Monti d'Urbino":

Il giogo dove 'l Tevere si disserra (*Inferno*, xxvii. 30).

Fig.2. THE ANCIENT LAKE BASINS OF CENTRAL ITALY (TUSCANY AND UMBRIA)



Longitudinal Sections

1200 m.) with Mte. Fumaiolo in the centre, constitutes the group of that name, which forms a curious, isolated Miocene cap superposed on the Eocene formation of the divide. It is composed almost entirely of a succession of most striking limestone buttresses or *balze*, while the basin which it encloses, including Mte. Fumaiolo proper, consists of much denuded, permeable sandstone, the latter forming the upper, the limestone belt the lower stratum of the Miocene cap. The famous *Vene del Tevere* rise on the southern flank of Mte. Fumaiolo at 1268 m. altitude, only 140 m. below the summit; but the Tiber has also captured a number of other, even more abundant springs within the basin or cirque which in great part belongs normally to the Adriatic watershed.[1]

Città di Castello.—Issuing from the cirque by the only southern opening of the belt, the Tiber rapidly descends through a narrow gorge 30 km. in length to the first ancient lake basin, which extends from Borgo S. Sepolcro (330 m.) to Città di Castello (286 m.). This lacustrine trough, 20 km. in length and 10 km. in width, lies between the Alpi della Luna (1154 m.) and the Alpi di Catenaia (1474 m.). The Pliocene lake deposits are in great part covered by Quaternary and more recent alluvial material, but they are exposed on the right margin of the basin, where on the hill-slopes they reach 500 m. altitude, or 200 m. above the valley floor, showing that the ancient lake must have been 200 to 250 m. in depth.

Umbertide—Perugia—Todi.—From Città di Castello, where the valley narrows, extends the chain of ancient lake basins of the Umbrian or middle Tiber. The first of these reaches to Umbertide (243 m.), where the valley again contracts; the second to Ponte S. Giovanni (210 m.), below Perugia; and the third to Todi (174 m.), their width being 5 to 10 km., and their aggregate length 80 km., or, including the Borgo S. Sepolcro or upper Tiber basin, 100 km.

Perugia—Foligno—Spoleto.—As shown in the hydrographic map, the Tiber Valley at the end of the narrow basin south of Umbertide, expands near Ponte S. Giovanni (210 m.), below Perugia,[2] and divides into two great fork-like arms, one the basin from

[1] The semicircular curve of the Fumaiolo belt is obviously the result of a contraction and shifting of the divide by earth-movements during the Quaternary uprise of the Apennines. Similar isolated Miocene caps in the same region, probably due to overthrust, are those of La Verna (1270 m.) on the divide of the Tiber and Arno watersheds; of Sasso di Simone (1220 m.), and, on the Adriatic versant, of Mte. Titano, one of the San Marino hills above Rimini. They also occur on the Gran Sasso d'Italia in the Abruzzi at altitudes of 1500 and 2500 m.

An interesting recent study on the *Sorgenti del Tevere* is B. Lotti's paper in *Boll. R. Com. Geol.*, Rome, 1916, p. 115.

[2] Ponte S. Giovanni is a famous, grim old bridge of six arches over the Tiber on the high road from Arezzo to Lake Trasimene, Perugia, Assisi, and Foligno. Perugia (500 m.) stands on an abrupt ridge 300 m. above the Tiber plain; Assisi, on the opposite side of the valley, rises to the same altitude on the flank of Mte. Subasio (1290 m.). The great memorial church of St. Francis d'Assisi (1182-1226). S. Maria degli Angeli, with his original oratory—*the Portiuncula*—in the nave, stands in the valley, near the railway station. It was built in the sixteenth century, and was damaged by the earthquake of 1832, but has been restored. The upper Tiber Valley (Città di Castello) experienced a severe earthquake in 1897.

Perugia to Todi already referred to, on the right, and the other from Perugia to Assisi, Foligno, Trevi, and Spoleto, on the left, which is the great trough known as the Valle Umbra or Plain of Foligno. The two basins are separated by the Mesozoic and Tertiary ridge of Mte. Martano (1094 m.),[1] not unlike the Belaggio spur which, on a smaller scale, separates the two similar arms of Lake Como and Lake Lecco. The Foligno lake basin, 50 km. in length and 10 to 15 km. in width, is a natural extension of the upper Tiber Valley, but its drainage was reversed by Quaternary earth-movements, which raised the Spoleto end[2] (300 m.) and reduced it to a *cul de sac*. Hence the four affluents of this basin, the Maroggia, Clitunno,[3] Topino, and Chiaggio, flowing north instead of south, discharge into one another in succession, and the last-named falls into the Tiber near Torgiano, almost at the wedge-point of the Martano spur. The present floor of the basin from Spoleto to Torgiano forms a gently inclined plane of 1 in 500. The subsidence of the Foligno basin is evidenced by a great fault which runs all along its right margin, and is the seat of often violent seismic disturbances.

Perugia—Todi.—No less remarkable were the hydrographic changes which affected the great Tiber basin from Perugia to Todi. As evidenced by the Pliocene deposits, the lacustrine expanse of that period communicated in its northern part with the sea through the gap of the Nestore Valley (10 km. south-west of Perugia) which connected with the estuary of Chiusi and Città della Pieve already mentioned, while in the southern part the lacustrine expanse extended from Todi into the Terni and Narni basin of the Nera watershed, and thence east to the Rieti (Velino) basin. The Quaternary uprise barred both these outlets, reducing the Todi end of the basin to a *cul de sac* like that of Spoleto, and reversing the drainage of the Nestore, which now flows into the Tiber. Hence the classic river eroded for itself a new western outlet

[1] Foligno (234 m.) is almost the only town of the Umbrian plains that is not perched on the steep mountain side (as protection against malaria and raiders). It stands in the valley on the marginal fault of the trough, and was greatly damaged by the earthquake of 1832.

The famous Via Flaminia, built by the Consul Flaminius in 220 B.C., from Rimini to Fano on the Adriatic littoral, and thence by the Metauro Valley and the Furlo Pass obliquely across the Apennines by Scheggia, at only 600 m. altitude, crosses the Umbrian Plain from Foligno to Bevagna, and thence the Martano ridge, at about 600 m. altitude, on its way to Narni and Rome. The road was in part reconstructed by Cæsar Augustus in 28 B.C., and the tunnel on the Furlo Pass, 30 m. long, at 190 m. altitude, was built by the Emperor Vespasian in 69 A.D. The scene of Hasdrubal's defeat by the Romans in 207 B.C. was in the Metauro Valley at the foot of the Furlo Pass. The Scheggia Pass is by far the lowest of the Central Apennines: hence the ancient military importance of the Via Flaminia.

[2] Spoleto gallantly resisted a siege by Hannibal in 217 B.C., of which the *Porta d'Annibale* is a still surviving record. The grim old castle of La Rocca was the residence of Lucretia Borgia in 1499, then only nineteen years of age. Mte. Luco (830 m.), which rises close to Spoleto, is the site of the Franciscan hermit dwellings in vogue in the sixteenth century. Michelangelo, who visited the locality in 1556, extolled the beauty of its situation.

[3] The ancient *Clitumnus* rises near Le Vene, between Foligno and Spoleto, not far from the high road, from a pool in a limestone rock, surrounded by trees and verdure, a picturesque spot described by Pliny. The neighbouring town of Trevi, perched on a peak like eminence, still boasts a *Porta del Lago*, in memory of the old Umbrian lake.

by a ravine 30 km. in length through the Mesozoic ridge of Titignano from Todi towards Orvieto, and thence along the foot of the Sabine Hills to Rome.[1]

The Pliocene deposits of the five Tiber lake basins are, on the floors of the troughs, often overlain by Quaternary and more recent alluvial deposits, but are exposed on one or on both margins and on the hill-slopes, often rising to high levels. Thus in the Città di Castello basin they reach altitudes of 500 m., in that of Umbertide, on Mte. Bastiola, 650 m., on both flanks of the Martano ridge, and near Todi, 300 to 400 m., and near Spoleto 800 m., pointing to a depth of the lacustrine expanses of 200 to 400 m. The Pliocene clay beds on or near the margins of the Umbertide, Todi, and Foligno basins, notably near Spoleto and along the base of the Martano ridge on both sides, contain lignite bands which are now acquiring importance, and are being worked more extensively than formerly.

The gradual conversion of the original lacustrine expanses of the Tiber Valley to separate lake basins was, apart from the effect of Quaternary earth-movements already referred to, largely due to banking by the deposits of tributary rivers which discharge into the Tiber at right angles. Thus the Città di Castello basin was banked by the river Cerfone on the right of the Tiber: that of Umbertide by the Assino on the left; and that of Foligno by the Chiaggio, which, crossing that basin at right angles at Bastia near Assisi, diverted the Tiber wholly into the Todi basin. In this respect the chain of Tiber basins strikingly presents the same features as the present chains of the lake basins of the Engadine in the Alps, and those of Neuchatel, Morat, and Bienne in the Jura,[2] formed in the same Quaternary period as the lake basins of Central Italy.

The Tributary Basins.

The ancient lake basins of the Tiber watershed comprise, besides the principal lakes, *i.e.* those of the Tiber Valley proper, the outlying basins of Gubbio, Terni, and Rieti in the tributary valleys of the Chiaggio, Nera, and Velino respectively. Alike in their origin, position, and their hydrographic features these basins are of special interest.

Gubbio.—This basin, 20 km. in length and 5 km. in width, forms a trough in the table-land or *altipiano* of the Umbrian Apennines, north-west to south-east, parallel to and between the latter and the Tiber Valley, at 475 m. altitude, or 200 m. above the Umbertide and Foligno basins. Although its floor is superficially covered with Quaternary and

[1] The Todi and Orvieto ravine of Titignano cuts at right angles the synclinal depression between the Amelia Hills (952 m.) and Mte. Peglia (823 m.). The Tiber emerges from this ravine 10 km. below Orvieto at its confluence with the Paglia, which rises in Mte. Amiata. From Orvieto to Orte and Rome the Tiber, following in the wake of the retreating sea, eroded its present bed in the Pliocene and Eocene groove between the Sabine Hills on the left and the great volcanic region of Bolsena, Viterbo, and Bracciano on the right. In this lower course of 160 km., much subject to floods, the fall of the river (120 − 10 = 110 m.) is only 0·7 in 1000.

[2] *Vide* the present writer's "The Engadine Lakes and Jura Lakes," *Geological Magazine*, 1893 and 1915.

alluvial deposits, it is a subsided trough of Pliocene origin, and contains several lignite bands embedded in the Pliocene lacustrine clay underlying the alluvia. It is drained by the river Chiaggio, which has its outlet at the south-east end, near Branca (375 m.) (10 km. west of Gualdo Tadino),[1] whence that river descends by a narrow ravine to Assisi and, after crossing the Foligno basin, discharges into the Tiber near Torgiano, as previously mentioned. The chief interest of the ancient lake basin of Gubbio lies in its now isolated position at a high level of the main range of the Umbrian Apennines as the effect of the Quaternary uprise, and, further, in the phenomenon that at its north-west end its former affluent, the river Assino, was barred by the deposits of the same, and thereby diverted to its present course direct into the Tiber at Umbertide.

Terni.—Of even greater interest is the ancient lake basin of Terni and Narni, 10 km. in length and width, traversed by the river Nera, which rises in the Sibylline Mountains and drains into the Tiber at Orte. The lake basin was in Pliocene times of much greater extent, connecting on the north side with the Todi basin of the Tiber Valley, and on the south with that of Rieti in the Velino Valley, while east it extended up the Nera Valley, and probably also to the Foligno basin at Spoleto, from which it is separated only by a low saddle 12 km. in length and 600 m. in altitude.[2] On the west, 5 km. from Narni, the basin opened into the sea by the estuary of the Amelia Hills, as is evidenced by the extensive brackish water deposits, *i.e.* the mixed Pliocene marine and lacustrine deposits of those hills, which were raised to their present level in Quaternary times.[3]

But at the end of the Pleistocene period, the Terni basin and sur-

[1] Gualdo Tadino (460 m.), 20 km. below the Scheggia Pass (660 m.), is on the Via Flaminia, which from here descends by Nocera and the Tapino ravine to Foligno. Near Gualdo Tadino the Byzantine general Narses (an Armenian eunuch) defeated the Ostrogoths, under King Totila, in 552 A.D. Both sides of the Scheggia Pass, which commands the Umbrian plain and the road to Rome, were the scenes of many battles for the defence or conquest of Central Italy.

[2] The Spoleto-Terni saddle, through which the railway passes by a tunnel, is a remarkable low syncline of 600 m. altitude compressed by and between the anticlines of Mte. Somma and Mte. Martano (1700 and 1900 m.). The former continuous valley is indicated by an opening on the divide, connecting the ravine of the Maroggia on the Spoleto, with that of the Serra on the Terni side. The continuous valley was raised and displaced by the Quaternary folding, faulting, and overthrusts of this whole region. Spoleto was the scene of a series of earthquakes in 1895.

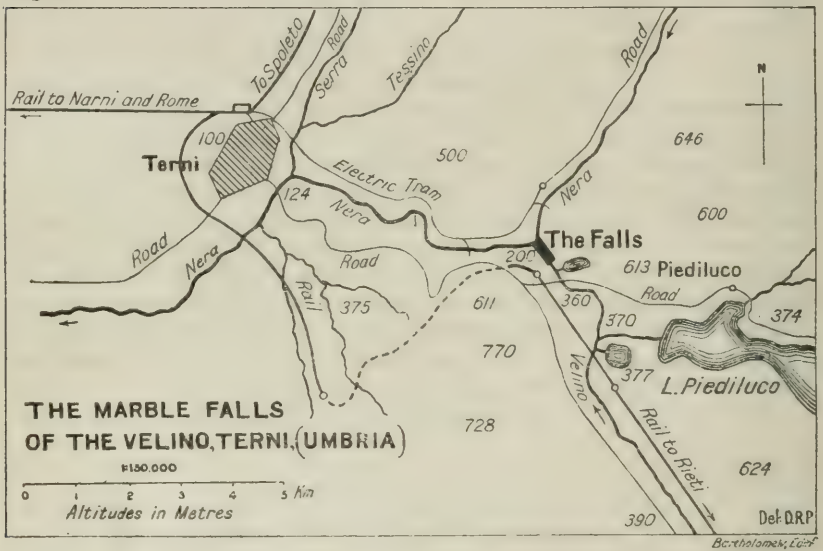
[3] The Pliocene deposits of the Amelia Hills cover the base and flanks of the ridge up to 300 and 400 m. altitude. The S. Pancrazio, Amelia, Peglia, and Montelcone Hills (900 to 1000 m.), a Mesozoic and Tertiary range south-east to north-west, 80 km. in length, extend from the Sabine Hills to Lake Trasimene. The Amelia Hills are cut at either end by the Nera and Tiber ravines respectively. Amelia boasts the most formidable and best preserved Cyclopean walls of the Etruscan towns of Umbria.

The Via Flaminia, descending from the Mte. Martano ridge by Acquasparta and the ancient Carsulae, near S. Gemini, crosses the Nera Valley immediately below Narni by the great viaduct of Cæsar Augustus (28 B.C.), 20 m. in height. Of the three arches only one and the piers of the other two are now standing.

Narni was the birthplace of the Emperor Nerva (96-98 A.D.), Pope John XIII (952), and other Roman celebrities. The town rises on a steep hill (200 m.), 100 m. above the valley floor.

rounding region presented a profoundly altered picture. The uprise and other earth-movements of that period had severed that basin from the Todi basin of the Tiber, the latter being at a level 70 m. higher than the former, and the two being separated by the divide of S. Gemini, 400 m. in altitude. Owing to the uprise of the Amelia and the Subapennine Hills, and the consequent recession of the sea, the connection of the Terni basin with the latter was also severed, and the river Nera eroded a new bed through the defile below Narni to its junction with the Tiber at Orte. Again, in the region immediately east and southeast of Terni, the river Velino, after traversing the lake basin of Rieti

Fig. 3.



(400 m.) and banking the smaller lake of Piediluco (370 m.), plunged by an almost vertical fall 160 m. in height and 20 m. in width—the *Cascate delle Marmore* (360 m.)—to its junction with the Nera (200 m.), 6 km. above Terni (100 m).[1] (Fig 3.)

[1] The Velino, at the head of the Falls, is a hanging valley, and the Falls themselves are due to the lowering of the bed of the Nera by erosion, possibly also by seismic dislocation. The Velino falls as a single, continuous column of 160 m. (328 ft.), with several minor falls or rapids below. In height it exceeds the Tivoli Fall (107 m.), the Pissevache (65 m.), and the Rhine Falls (20 m.), but is exceeded by the Staubbach Fall (300 m.). It is half as high again as the towers of the Forth Bridge (360 ft.), and the dome of St. Paul's. The mean head of water at the Falls (20 m. in width) is 60 cubic m. per second; the potential energy of 75,000 H.P. is in part utilised by large steel works, arm factories, calcium carbide works, etc., at Terni. The name "Marble" Falls is derived from the thick crust of travertin which covers the Jurassic limestone rocks, and has the appearance of polished marble. The travertin formation is constantly increasing, the Velino being heavily charged with carbonate of lime in solution. The total fall of the Velino from the top of the gorge, close to Lake Piediluco, to its junction with the Nera, and of the latter to Terni is 246 m. (810 ft.) in a distance of 8·66 km. (5·4 miles), as follows:—

While the greatly reduced Terni basin thus came to form the lowest of all the troughs of the Tiber watershed, flanked on either side by hills up to 400 m. altitude, the Pliocene deposits of the region immediately east of the same were raised to 800 and 900 m. altitude, a phenomenon which strikingly attests the magnitude of the uprise, accompanied by seismic earth-movements, of the early Quaternary period.

Rieti.—This historic lake basin, one of the most beautiful of Central Italy, lies at 400 m. altitude, NW. to SE., between the *massif* of Mte. Terminillo (2213 m.) on the right and the S. Pancrazio Hills (1024 m.) previously mentioned, on the left, both of Mesozoic age, while to the SE. extend the Sabine Hills. The present basin is 20 km. in length and 5 to 10 km. in width, including the picturesque small lake of Piediluco (2 by 2 km.) at its NW. or Terni end, which is a remnant of the larger Pliocene lacustrine expanse.

The peculiar feature of the Rieti trough consists in its being the collecting basin of an extraordinary large drainage area. Besides its principal affluent the Velino, which rises in the Sibylline Mountains, no less than four parallel rivers, *i.e.* the Salto, Turano, and two others drain into it from the Sabine Hills (SE.), and five smaller torrential tributaries from Mte. Terminillo (N.). The collective drainage of these nine rivers accounts for the large volume of water (60 cubic m. per second) carried by the Velino at its exit from the Rieti basin above the Falls of Terni. The exuberantly fertile and highly cultivated plain[1] is dotted with several lakelets and former islets, and the alluvial deposits of the inflowing rivers constantly tend to raise its level above the already considerable travertin formation, which renders the basin liable to floods.[2] The Pliocene lake deposits appear in several of the islets and along the lower slopes of Mte. Terminillo, as well as in the valleys of the Sabine Hills, SE. of the basin, where they form terraces at more or less uniform levels up to 800 and 900 m. altitude.

Head of the Velino gorge at Lake Piediluco, altitude 370 m.			
Head of Falls.	360 m.	2·5 km. = 4 in 1000.	
Falls above junction with Nera.	200 m.	0·16 km. = vertical.	
At Terni.	124 m.	6·0 km. = 2·3 in 1000.	
	Total fall, 246 m.	8·66 km.	

As is seen from the small plan, Fig. 3, the Falls and the junction of the two rivers are surrounded by hills of 600 and 700 m. altitude, *i.e.* double that of the Falls, but are conveniently accessible by road, electric tramway, and railway, and lie amid beautiful scenery.

[1] Very few remains exist of *Reate*, the ancient Sabine capital, from which Rieti derives its name. Varro, the great Roman savant (116-27 B.C.), a native of Reate, regarded the *Lacus Cutilius*, near Reate, now the sulphur lakelet of Letogrammo, as *umbilicus*, the centre of the Italy of his day. The Emperor Vespasian (69-79 A.D.) was also born at Reate, and died at the sulphur baths of Paterno, the ancient *Aquae Cutiliae*, 8 km. east of Rieti, during his last annual visit.

[2] To prevent the periodically recurring floods, Marcus Dentatus drained the Rieti basin as early as 272 B.C. by a canal, which was abandoned later, but reopened by Pope Clement VIII in 1598, after two other overflow-canals, built in 1422 and 1546, had proved inadequate. The Dentatus canal, in an improved form, is still in use.

Within the last thirty years, an important network of costly and difficult railways has been constructed in the Abruzzi, linking the longitudinal and cross valleys and connecting with Rieti and Terni.

The whole basin and the surrounding belt of mountains are liable to seismic disturbances, and a considerable old lava flow associated with tuff at Coppaeli, near Rieti, as well as a multiplicity of sulphur springs, afford proof of volcanic activity contemporaneous with the great Quaternary eruptions in the Roman Maremma.[1] Irrespective of these phenomena, the lake basin and uplands of Rieti exhibit evidence of the same considerable but unequal Quaternary uprise of 500 to 1000 m. above sea-level as the other Pliocene basins of Umbria.

Leonessa and Norcia.—Two remarkable high-level lake basins, about 5 km. in length and width, lie north of Rieti: the Leonessa basin—in form not unlike Lake Lugano—at 970 m. altitude, at the northern base of Mte. Terminillo, in the upper Corno Valley, a tributary of the Nera, 30 km. east of Terni: and the Norcia basin,[2] at 600 m. altitude, called *Piano di Santa Scolastica*, at the western base of the Sibylline Mountains, 30 km. north-east of Spoleto. It is drained by an affluent of the Corno and Nera. Both basins are surrounded by high mountains, and are of Pliocene origin, but became subsided troughs in Quaternary times.

(To be continued.)

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Meeting of Council.

A Meeting of Council was held on the 27th March, when the under-mentioned ladies and gentlemen were elected Members of the Society:—

Ordinary.

L. W. G. Malcolm, Lieut. R.G.A., F.R.S.E., F.R.G.S., F.R.A.I.
John Henry Kenneth, F.Z.S.S., F.R.Ph.S. Ed.
William Blair, W.S.
Donald Sutherland, M.A.
Miss Nance Anderson.
Major A. Livingstone Bruce, M.C.

Associate.

James Farmer, M.A.
Angus Macdonald, M.A.
James Beveridge.
Miss Mary H. Rough, M.A.
George H. Johnstone.
Miss Mary S. McQueen.
John C. Watson.
John Bowie.

Donations to the Funds of the Society.

In the last circular relating to these donations a subscription of £50 was erroneously ascribed to "Mrs. A. B. Bruce" instead of Miss A. B.

[1] Rieti and the surrounding district were visited by a disastrous earthquake in 1898, when the town was seriously damaged, and the village of Coppaeli was entirely destroyed.

[2] Norcia was the birthplace of St. Benedict (480-543) and of his sister Scolastica: hence the name of the lake basin.

Bruce (Gordon Terrace). The total amount of these donations now exceeds £250, but the estimated deficiency in the ordinary revenue of the Society for the year ending September 30, 1919, is about £400.

GEOGRAPHICAL NOTES.

EUROPE.

Suggested New Subdivision of France.—It is a familiar fact that the Revolutionary subdivision of France into departments for administrative purposes has always met with a considerable amount of passive resistance on the part of the French people, for whom the older and much more natural division into provinces has great attractions. It is therefore of interest, from more than one point of view, to notice that a new project is being brought forward to divide the country into sixteen economic regions, each with its regional capital. The subject is discussed briefly in a note in the *Revue Générale des Sciences* for February. The basis of the proposed subdivision is to be the existing economic conditions, no attempt being made to restore the old provinces, but the question as to which set of conditions is to be utilised is giving rise to discussion. In the first place, each region is to be regarded as stretching out from some particular centre, which forms its capital, its point of crystallisation. These capitals are nodes in the network of lines of communication, places where exchange is carried on, market towns for neighbouring regions; areas of great industrial activity also, of dense population, where capital is concentrated, and which serve as financial, banking, and intellectual centres, supplied with a local press, and with schools for technical instruction. In this country such regional capitals, or their equivalents, are, as a rule, the focal points of areas in which one particular industry, or a group of industries, is carried on. Thus Manchester is the centre of the cotton area, Leeds of the woollen area, and so forth. But in France this localisation of industry is, on the whole, less marked, and the suggestion is made that such points as the distribution of the local newspapers and the characters of the technical institutes should be taken into account in delimiting the area round the "capitals" which can legitimately be regarded as forming part of the region of each. The subject is of much interest, for it would appear to be a part of that re-growth of local and regional patriotism which is the natural response, from the constructive side, of the peoples whose existence has been threatened by the internationalism of industry. Some of the new regions are already officially constituted, such as Nancy, Bordeaux, Clermont, Limoges, Rouen, Nantes, Toulouse, Montpellier. In other cases controversy is still going on. Thus Nice refuses to be joined to Marseilles on the ground that the tourist traffic there introduces a divergence of interest as compared with the trade and commerce of that industrial centre: Besançon maintains that its watch making industry differentiates it from the great agricultural centre of Dijon to which it is proposed to attach it. Similarly Chambéry refuses to

recognise the supremacy of Grenoble, which has a development of water-power not found in the former town; St. Étienne is unwilling to be subordinated to Lyons, Nimes to Montpellier. Whatever decision is reached in those difficult cases, and in regard to the general problem of settling the boundaries of the regions, and the allocation of towns which stand near the margins of two regions, it is obvious that as a method of obtaining decentralisation the scheme has many advantages.

Another note on the same subject, illustrated by sketch-maps, appears in the *Geographical Review* for March, where also there is some account of a proposed new subdivision of Germany.

Spitsbergen and the Arctic Route to Muscovy.—Professor Grenville Cole took as the subject of his presidential address to the Geographical Association in January last "The Narrow Seas and the Arctic Route to Muscovy," and his address is printed in the Spring number of *The Geographical Teacher*. It gives a very interesting account of the attempts made in the latter half of the sixteenth century to open up trade with the East *via* the Arctic coast of Russia. At this time Muscovy had but a narrow frontage on the Baltic at Narva, and was largely cut off from the west by growing Poland. Willoughby and Chancellor, it will be remembered, set out from London on May 10, 1553, with three ships, looking for the road to the east, "which is into the North." Sir Hugh Willoughby and two of the ships were lost, but Chancellor succeeded in entering the White Sea, and reached Moscow by sledge. He was much impressed by the undeveloped power of Russia, saying, "If they knewe their strength no man were able to make match with them. But I thinke it is not God's will."

Chancellor was back in England in 1555, and arrangements were made at once for trading with Moscow by the new route. Entry was made by the Dwina, which in summer-time was followed during a fourteen days' journey to Vologda. In winter, when sledging over the frozen marshes was possible, the time was reduced to eight days. From Vologda the journey was continued to Yaroslav, on the Volga, whence on the one hand Astrakhan and the Caspian could be reached, and on the other Moscow. This Volga route became the recognised English way to Persia: and Archangel, founded in 1584, was the entrance both for Great Britain and Holland into Muscovy till the founding of St. Petersburg in 1702-4.

Professor Cole then goes on to give some account of Spitsbergen, as the "crow's nest" of the Arctic route, and urges that it must remain in friendly hands, especially now that the Baltic coasts are once again "beset by a flux of warring populations," for "the conditions of the sixteenth century may too easily return, and no navy can widen the channel between Helsingör and Helsingborg."

Exhibition of Early Maps of Edinburgh.—This exhibition, of which Mr. Harry Inglis gave some account in the last issue (p. 134), was opened by Col. Sir Duncan Johnston, R.E., K.C.M.G., C.B., on Monday, April 7, in the presence of a large audience. After Sir Duncan John-

ston's introductory remarks, Mr. W. Cowan gave a short account of the exhibits. The exhibition was thereafter open to members and others interested, and was visited by a large number of people. For the first few days the attendance averaged about one hundred per day, and the interest excited was shown not only by the numbers but also by the detailed examination to which many of the visitors submitted the more interesting maps, plans, and pictures. On Monday, April 14, Captain Mears delivered a lantern lecture on "Primitive Edinburgh" to an audience which completely filled the room.

An Early Scots Colony in the Caucasus.—The following quotation from the *Athenæum*, for August 1807, gives some curious facts not without interest at the present time:—

"Scots Colony.—An article in the foreign papers, dated St. Petersburgh, May 4, says: 'His imperial Majesty has been pleased to grant a very remarkable charter to the Colony of Scotchmen who have been settled, for the last four years, in the mountains of Caucasus. The rights and privileges accorded to these Scotchmen, who form a detached settlement in a district so thinly peopled, and bordering on the territories of so many uncivilised tribes of Mahometans and Heathens, are intended to increase their activity in extending trade and manufactures, and to place them, in respect to their immunities, on the same footing with the Evangelical Society of Sarepta. They are to have the requisite additional allotments of land, as near as possible to the village which they have already founded. Of these his Majesty secures to them the perpetual possession, promising that no part of the tract allotted to their community shall ever pass by sale, mortgage, or bill of emption, or on any other pretence, into the occupation of strangers. They are exempt from all imposts or burthens for thirty years; at the end of which period they are, instead of poll tax, to pay 15 copecks of rent for each acre of arable land, and to pay their proportion of the land tax, but to remain exempted from all other imposts, from the civil and military service of the state, and from the billeting of soldiers in any of their villages. The free exercise of their religion is confirmed to them, and the internal affairs and police of the settlement shall for ever be administered by a magistrate chosen from among themselves. His passports will be a sufficient authority for them to travel and traffic in every part of the empire, but not for leaving the country. The Chief Magistrate is not, without special permission, to admit to the privileges of a colonist any Russian subject, but is at liberty to receive, as settlers, Kabardans, Circassians, and every other description of Mahometans and Heathens, being freemen, and taking the oath of allegiance to his Majesty. These may also become converts to the religion of the colony. The colonists may also buy and keep Kabardan, Circassian, and other Mahometan and Heathenish slaves. They may freely exercise every sort of trade, art, or manufacture, and, within their own limits, distil and vend spirituous liquors. The colony is placed under the special protection of the civil government of Caucasus.'"

French Library in Scotland.—With the object of promoting a knowledge of French thought in this country and making French books on literary, scientific, and other subjects more readily available than they have been in the past, a library is being established at 128A George Street. The enterprise is under the patronage of the Franco-Scottish Society, but the reference library is open free to the public at certain times, and members of the public may also become subscribers to the circulating library. It is intended to make the collection of the newest guide-books and maps of France a feature of the library, so soon as the conditions make this possible, and various newspapers, reviews, and other periodicals are also to be included. Further, the library is to form a general bureau of information in regard to the latest French publications, both on literary and scientific subjects. Application should be made to M. J. B. Coissac, Directeur de la Bibliothèque Française, 128A George Street, Edinburgh.

Economic Geography.

Lead Ore in the West Highlands.—During the construction of the new road from Ballachulish to the village of Kinlochleven, which has been in progress during the war, several seams of lead ore have been discovered, believed to be rich enough to warrant regular mining operations. The first seam discovered is about 8 inches in thickness, and the others are apparently more valuable than the first. The seams are all close together, and can be seen in the cutting of the rock, running down to near the shore. It is thought that the seams may be thicker as they run into the higher ground, and that they may be a continuation of seams previously known to exist on the other side of Loch Linnhe.

Port Development in France.—A vast programme for the development of ports, railways, and river navigation, such as will meet all the demands made on them by the enlarged maritime traffic which is anticipated after the war, is being drawn up in France. In the first place, the capacity of Algiers is to be increased threefold. An immense outer harbour is to be constructed capable of receiving the biggest cargo boats, liners, and warships.

The second part of the programme contemplates improvements at La Pallice, the port for Bordeaux. It includes a calling quay enabling big vessels to utilise the deep channel, which is only 1300 yards from the port. The quay will be available for vessels drawing up to 39 feet.

By the third part of the scheme it is contemplated to make Marseilles one of the biggest ports in the world. By deepening and improving the Port de Bouc and utilising the Etang de Caronte new quays will be opened up, making a total quay line of about 21 miles. This scheme will give access to the Etang de Berre to vessels drawing 31 feet.

By this means a hinterland will be created close to Marseilles for workshops and accessory buildings, which will spring up like mushrooms along the banks of the Etang. Brest is already in the hands of a Breton

consortium, which intends to render the commercial port one of the termini of the great transatlantic lines.

The Rhône is to be developed from the threefold standpoint of navigation, irrigation, and the production of electric power (750,000 horse-power). The navigation of the Rhône is to be completed by a canal joining the Rhône and the Rhine. This new canal is designed to attract Alsace-Lorraine traffic and that of the Saar coal-mines and Upper Alsace, and the working and industrial centres of Strasbourg, Mulhouse, and Basel will be in touch with the Mediterranean ports.

EDUCATIONAL.

Suggested Geophysical Institute at Cambridge.—An influentially signed appeal, headed by Dr. Shipley, Vice Chancellor of the University of Cambridge, is being issued for the creation and endowment of a Geophysical Institute at Cambridge. The letter states:—

"The need of a British Geodetic and Geodynamic Institute is admitted by all who are acquainted with the nature and importance of the pressing imperial and scientific problems which depend on the great surveys. The opinion has been widely expressed that the University of Cambridge is specially competent to undertake officially, in the public interest, the scientific investigation and practical training that would be involved in such an institute. A committee has been formed for the purpose of making an appeal for the support that is necessary if this project is to be entertained.

"The committee have estimated that an endowment of £50,000 would be necessary, if the proposed institute is satisfactorily to perform the double task of research and education; but it is hoped that if half of that sum were contributed by private benefactors the remainder would be forthcoming from national funds.

"An essential part of the scheme would be the foundation of a University Professorship of Geodynamics, to be held by the Director of the institute. To place this Professorship in line with other Chairs, recently endowed by private benefactions, and usually associated with the names of the donors or founded as memorials of national sacrifice in the Great War, a sum of £20,000 (which is included in the £50,000 mentioned above) would be required.

"It is the widespread British territories which are most closely concerned in the great international surveys of the future, and indeed of the past; and the consolidation and extension of their special surveys is most necessary to the solution of the geophysical problems of the world. It would be matter for regret if from omission of the relevant scientific development at home, British official surveyors were again compelled to rely on the Prussian Geodetic Institute at Potsdam for information with regard to international work in the higher geodesy

"It is in connection with a great Imperial University, which has always been conspicuous for devotion to cognate studies, that the width and

freshness of outlook are to be sought which are essential to this progressive practical science. The committee have evidence that an institute at Cambridge would be cordially welcomed by the National Survey Departments, both terrestrial and oceanographic. It is certain that all who have to do with our shipping interests, or with aerial navigation, would ultimately profit from the establishment of such an institute."

NEW BOOKS.

EUROPE.

The Cradle of the War. The Near East and Pan-Germanism. By H. Charles Woods, F.R.G.S. With Foreword by A. Lawrence Lowell, President of Harvard University. London: John Murray, 1918. *Price* 12*s. net.*

The cradle referred to is, of course, the Balkan States, and it was diligently rocked by that hand which aspired to rule the world. The book sketches the history of the country prior to the war, and shows how the so-called Balkan Settlement was of so unsatisfactory a nature as merely to prepare the way for a renewed conflagration. The results were disproportionate, and even those States that had acquired territorial advantages were conscious that, with the impending threat of Austria and Turkey, these advantages meant nothing to them. From the moment of the murder of the Archduke Ferdinand and his consort the hand of Germany controlled the actions of both Austria and Turkey. The Germans even endeavoured before Turkey had actually been hustled into the war to telegraph instructions to the Turkish Staff at Erzeroum without the authority of the Ottoman Government. It was the Germans, too, who were the moving spirits in the cold-blooded massacres of fully one million Armenians.

Mr. Woods deals shortly with the British Campaign in Mesopotamia. The first part of the advance beyond Kurna, he holds, was prudent and necessary. But there was no warrant for the further dash for Baghdad with the forces and preparations then available. The Dardanelles Campaign receives fuller treatment. The area is one with which the author had previously gained a close personal acquaintance. His conviction is that had it been possible for a British Fleet to appear in the Sea of Marmora at an early stage of the war, it would have led not only to immediate overtures for peace from the Ottoman Government but to the entry into the war upon our side of Bulgaria, Greece, and Roumania—in fact, the gain of an inestimable advantage. When we did take action it was upon an urgent request for assistance from Russia, and loyalty to an ally seems to have outbalanced military considerations. Mr. Woods' conclusion is that the more one knows of the Allied difficulties existing at the time, and the more one has seen of the areas in question, the less one is inclined to criticise. The feat of arms which our forces accomplished receives full acknowledgment. The Salonika Campaign, and the Baghdad Railway, that indispensable link in the German "Drang nach Osten," are the subjects of special chapters.

The book is written with a wide personal knowledge of the persons, peoples, and localities involved, and its sane and judicious opinions are of real value. We should not, by the way, have expected from such a well-informed writer such a slip as "four knots an hour." Five maps and some good photographs add to the usefulness of the text.

Scenes from Italy's War. By G. M. Trevelyan. London and Edinburgh: T. C. and E. C. Jack, 1919. *Price* 10s. 6*d. net.*

A book like this, by the author of *Garibaldi and the Ten Thousand*, is sure of a hearty welcome, especially when we remember that he was in charge of the First British Red Cross detachment on the Italian front, and was present at all the chief actions. He begins by describing how Italy, in spite of "the Kultur disease" with which Germany had infected her, resolved, when the war opened, to be neutral. But neutrality did not satisfy the idealists of Italy, and a great agitation continued till, on 24th May 1915, Italy declared war on Austria-Hungary. The pro-German Giolitti fled from Rome, and Salandra and Sonnino remained in power. With regard to the Church in Italy, "the ordinary Catholic, as distinct from the Vatican party, was patriotic, and the army chaplains were invariably patriotic." "In all Italy the touchstone of enthusiasm for the war has been friendliness to England, and the touchstone of indifference or aversion to the war has been Anglophobia. The memory of the old friendship for England, as the first and most disinterested champion of Italy as a nation, was a most potent factor."

The First British Red Cross detachment, commanded by the author, left Southampton on 22nd August 1915, and, reaching Havre, drove across France, arriving at Modane on 29th August with all their twenty-six cars up to time. On the 31st they reached Udine, and thence proceeded to the zone of Gorizia and began service with the Sixth Italian Army Corps before Monte Sabotino. The author gives a graphic description of the fierce assault of the Italians on the enemy holding Gorizia, an assault complicated by cholera derived from the Austrian trenches. He describes the famous corps of Bersaglieri, Alpini, Arditi, and Granatieri, the glories of the Italian army. On 6th August 1916, all Monte Sabotino was in Italian hands, and three days later Gorizia was taken after prolonged assault. During the first two years and more of the war the field hospital at Villa Trento (180 beds) formed part of the author's unit, and he remarks: "The hospital leant much on Scotland, for besides Dr. Brock, the director, we also had the honour to have with us Sir Alexander Ogston, whose fame, and whose quiet benevolent courtesy to all persons great or small, added to the prestige and popularity of Villa Trento. Dr. W. E. Thompson, of Canada and Scotland, ably represented the younger generation of surgery." The author mentions being struck with British wounded reading while ill, Italian soldiers preferring to lie still. Gorizia was formerly "a health and pleasure resort of the Austrian military and bureaucratic classes, lying in a mild climate," very different in winter from that of Trieste. The Carso, a limestone tableland, stretches between Gorizia and Trieste, and looked like a Scotch moor stripped of heather. Over this terrible land the Italians won their way, yard by yard, from June 1915 to October 1917. And then came the crash!

The victorious Italian army was only a dozen miles from Trieste when the tremendous cataclysm of Caporetto occurred, and it had to fall back seventy miles to the line of the Piave. The author frankly discusses the causes of this appalling retreat. He explains that "there were three distinct categories of conduct among the Italian troops." There were 1 "a few regiments who, in accordance with a previously-formed intention, abandoned their duty, and surrendered on purpose." There were 2 war-weary regiments who "flung away their rifles wholesale." But there were also 3 the bulk of the army, who did their duty throughout, who retreated in order, and who "saved Italy by holding fast where required." The last, with the assistance of British, French, and American troops, gloriously retrieved the disaster of Caporetto, and in October 1918 drove the Austro-Hun

garians out of Italy and planted the Italian tricolour on the walls of Trieste. Mr. Trevelyan's book is charmingly written, and is illustrated with twelve maps explanatory of the campaign.

Commercial Russia. By William Henry Beable. London: Constable and Co., 1918. *Price* 10*s.* 6*d. net.*

Although commerce in Russia will be largely impracticable as long as the Bolshevist Reign of Terror exists, it is well that we should know what Russia offers to commerce when happier days arrive. The present volume is the result of two visits to Russia in 1916 and 1917 of an Anglo-Russian Trade Commission, organised by Mr. Beable "for the purpose of investigating on the spot the possibilities of British manufacturers in Russia, the best methods to be employed for securing trade after the war, and as far as possible putting those represented into communication with reliable agents and responsible buyers." The author spent six months in Russia in 1916, during which he visited every important commercial district, while in 1917, during the height of the revolution, another member of the Commission visited Russia on behalf of a further combination of British manufacturers in non-competing businesses. The result of the combined experiences of these two trips, together with that derived from numerous correspondents in Russia, both natives and Englishmen long settled in that country, are embodied in this valuable book.

The author describes, in succession, travelling in Russia, the country, the language, the people, the big cities, the smaller towns, the question of credit and law, agents, Government and official buyers, the ports and shipping, the Baltic Provinces and Poland, the Ural Mountains and Ekaterinburg, Finland, Siberia, agricultural machinery, chemicals, and general merchandise, textiles and textile machinery, trading in Russia, boots, shoes, and leather, motor cars, machinery, electrical and engineering, iron and coal, and Russia's natural resources.

Writing in January 1918, the author is hopeful regarding Russia, and believes that "the country will emerge from the present crisis as one of the great progressive republics of the world. In any case, whatever may be the outcome of the present situation, the fact remains that nearly two hundred millions of people, whether they continue to be one united Russia, or a number of smaller states and republics, will want everything that the United Kingdom can supply, and that they are so abundantly supplied with natural resources that the question of payment is not a difficult one. The unexplored forests of Russia would alone pay for all its war debt, and leave a handsome margin. If Germany gets a commercial foothold again in Russia, it will not be through diplomatic or political action, but owing to its preparedness and our lethargy."

AFRICA.

Native Races and their Rulers. By C. L. Temple, C.M.G., late Lieutenant-Governor Northern Provinces, Nigeria. With Illustrations by the Author. Cape Town: Argus Printing and Publishing Company: London Agents, Way and Co., 1918.

This is not a book to be read in a hurry. Eight out of the fourteen chapters are entitled "Ponderation," and that ponderation is based on observation carried out during some thirteen or fourteen years of official life in Nigeria, obviously with unremitting earnestness, sympathy, and dispassionateness. The result is a small book (for it extends, including the numerous illustrations, to little more than 250 pages) worthy of all the attention and consideration which it demands

of the reader, even when he finds that he must himself ponder sentence by sentence the author's presentation of facts, and the conclusions he bases thereon. The reading of the book is, however, somewhat lightened by the author's quiet, reflective humour harmonising with the qualities above mentioned. If one who merely glanced at the volume should stumble on the last sentence of Chapter VI., which reads, "If the liar and his lies passed away, then all I can say is that a Resident's life has been shorn of half its poetry and romance," he might, perhaps, think that this is hardly in keeping with the spirit of earnestness claimed for the author. But in truth there is no cynicism in the chapter thus concluded. It is merely a good-humoured and tolerant recognition of fact, justified, perhaps consciously, perhaps unconsciously, by the Gospel maxim, "Judge not that ye be not judged." The author's official life disposes him naturally and properly to keep what is immediately practicable in view in his suggestions, but for all that he always endeavours to recommend, among what he considers practicable, what he believes will prove most beneficial to the mass of the people in a perhaps distant future. He is in favour of indirect rule of native states, the government of natives by natives, with as little interference as possible by the paramount authority, and a whole chapter is devoted to the exposition of all that this implies. A summary of his arguments on this head is given in three pages in the Contents, which include also an analysis of two other important chapters in the book. Some of the author's suggestions are very bold. In the chapter on Drink, for example, he, though not a teetotaller either in principle or practice, goes so far (pp. 179-80 as to advocate the abstention from alcohol even by Europeans while living in "native countries," believing that the prestige of the white man is still sufficiently operative "to cause such a self-denying ordinance, if adopted for all indiscriminately, to be accepted without demur by the respectable natives." Naturally, much incidental information is given about Nigeria, and one of the most striking things in the book is the emphasis he lays on the unhealthiness of the whole region. In making such remarks (pp. 11-12) he calls attention to the fact that before coming to Nigeria he had spent seven years in Brazil, concluding with an uninterrupted spell of three years on the Amazon at Manaos and Pará, whereas in Nigeria even the sturdiest European cannot serve for more than eighteen months at the outside without weakening his constitution in a manner that will curtail his future activities to an abnormal extent. Many of the illustrations are characterised by the same whimsical humour as appears in the text.

GENERAL.

The New Hazell Annual and Almanack. By T. A. Ingram, M.A., LL.D. Thirty-fourth year of issue. London: Henry Frowde, 1919. *Price* 6*s. net.*

The issue of this *Annual* for the present year was delayed in order that the results of the General Election, and the composition of the new Ministry, might be included in its contents, and the date of publication is given as February 1919, some three months after the signing of the Armistice. The delay has made it possible to include also in the contents some of the changes which those three months have seen in the political situation in Continental Europe. The time for a complete reconstruction of the sections relating to foreign countries has obviously not yet arrived, and in future years we can imagine readers turning to the issue in order to realise how completely Europe was in the melting-pot in the winter of 1918-19. So far as we have tested the book, the Editor seems to have shown much judgment in the arrangement of his material, which is naturally very difficult to deal with at the present time. The other sections of the book are much as in

previous years, and there are a number of interesting general articles on problems connected with the war, and good summaries of the events of the year under review. The price cannot be regarded as high in present conditions, and the editor promises that it shall be reduced for future issues, as soon as this becomes possible.

BOOKS RECEIVED.

La Question Roumaine en Transylvanie et en Hongrie. Par AURELE C. POPOVICI. Cr. 8vo. Pp. 230. Librairie Payot et Cie., Paris 1919. *Price* 4*f.* 50*c.*

Russia's Ruin. By E. H. WILCOX. Demy 8vo. Pp. 316. Chapman and Hall, Ltd., London, 1919. *Price* 15*s. net.*

Greece before the Conference. By POLYBIUS. With a preface by T. P. O'CONNOR, M.P., and an Ethnological map. Crown 8vo. xxvi + 120. Methuen and Co., Ltd., London, 1919. *Price* 5*s. net.*

Pourquoi la Roumaine a fait la guerre. By J. URSU. Crown 8vo. Pp. 280. Librairie Payot et Cie., Paris, 1918. *Price* 4*f.* 50*c.*

Syria: The Desert and the Sown. By GERTRUDE LOWTHIAN BELL. New and cheaper edition. With many illustrations and a map. Crown 8vo. Pp. xvi + 340. William Heinemann, London, 1919. *Price* 7*s.* 6*d. net.*

The Human Geographies. Book I.: Children Far Away. Crown 8vo, pp. 103. *Price* 1*s.* 6*d.* Book II.: Homes Far Away. Crown 8vo, p. 106. *Price* 1*s.* 6*d.* Book III.: The British Isles. Crown 8vo, pp. 154. *Price* 1*s.* 9*d.* By J. FAIRGRIEVE, M.A., F.R.G.S., and ERNEST YOUNG, B.Sc., F.R.G.S. George Philip and Sons, Ltd., London, 1919.

Reminiscences of an Ancient Mariner. By JOHN JAMES MAHLMANN. Illustrated. Royal small 8vo. Pp. vii + 240 + li. The "Japan Gazette" Printing and Publishing Co., Ltd., Yokohama, 1918.

Et le Monténégro? Exposé de la Question balkanique. Par JEAN ARGILLE. Pp. 20. Blanchong et Cie., Paris, 1919.

The Australian Environment. A Regional Study of the topography, drainage, vegetation and settlement; and of the character and origin of the rains. Memoir No. 1. By GRIFFITH TAYLOR, D.Sc., F.R.G.S. H. J. Green, Melbourne, 1918.

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE PRESENT STATE OF SPITSBERGEN.

By R. N. Rudmose Brown, D.Sc.

With Sketch-Map and Illustrations.[1]

During the three centuries that have elapsed since its discovery by Barents and Heemskerke in 1596 Spitsbergen has experienced several phases of economic development. When the captains of the Muscovy Company of London drew attention in 1610 to the whales and walrus in the bays, there began the period of the whalers. For nearly half a century whalers from London and from Dutch ports flocked to the bays on the north, west, and south coasts of Spitsbergen every summer. They began by hunting walrus, but soon paid more attention to the quest of the right whale. Eventually excessive whaling frightened the whales from the inshore waters, and the whalers had to desert the bays for the open-sea fishing. In that form whaling persisted in the Greenland Sea until the present century, the original English and Dutch whalers being joined at first by Swedish and German, and eventually replaced altogether by Scottish whalers.

After the whalers deserted the bays Spitsbergen had a short period of comparative neglect, but early in the eighteenth century Russian trappers appeared on the scene. They used to come in the autumn, and spend the winter in rude huts at various places along the coast for the purpose of obtaining the winter skins of bears and foxes. In numbers the Russian trappers were probably not large during any one winter, but they spread widely round the coasts: there are few bays or headlands on Edge Island, the west or north coasts of Spitsbergen,

[1] The blocks of the accompanying illustrations, taken from Sir Martin Conway's article on "The Political Status of Spitsbergen," in the February number of the *Geographical Journal*, have been kindly lent by the Royal Geographical Society.—Ed.

including Prince Charles Foreland, that they did not frequent. In many places the mouldering remains of Russian graves, like the whalers' graves, can be seen to this day. The Russians virtually colonised the shores of Spitsbergen for over a hundred years.

Before Russian trappers ceased, about 1852, to winter in Spitsbergen, Norwegian hunters put in an appearance. It was probably the rivalry of Norwegians, coupled with a growing scarcity of game, which ultimately drove the Russians from Spitsbergen.

The Norwegian hunters began to go north in the early twenties of the nineteenth century. For many years they were mainly summer visitors for white whales, seals, walrus, and reindeer, but occasionally they wintered. However, it took many years for the game to recover from the inroads of the Russian trappers, and it was not until the rising prices of fur early in the twentieth century promised the hunter a good return for his risk and trouble that Norwegians began systematically to winter in Spitsbergen. By 1909 or 1910 this occupation was at its height, some two hundred hunters passing the winter in the north in scattered groups of two, three, or five. Then the slaughter of game brought nemesis to the hunter: gradually the numbers dropped off until to-day there are only a few dozen winterers, and there would be fewer were it not that the Russian and Siberian fur markets are temporarily dislocated, and the price of furs has risen enormously.

With these two phases of Spitsbergen history it is not proposed to deal except as regards certain events and conclusions bearing on the present political status of the country. The whaling and hunting periods have been fully described by Sir Martin Conway, Gunnar Holmsen, and others.[1]

One may say that the hunting period is now virtually over. The whaling period, despite a brief revival from 1903 to 1909, is closed. Spitsbergen is now experiencing the third era in its commercial development, its mining period. The history of that period has not yet been written: these notes are an attempt to put on record certain of the more important events, and to discuss the outstanding questions in the modern history of the country.

The discovery of minerals in Spitsbergen is almost as old as the discovery of the country. Stephen Bennet found silver and lead ore in Bear Island in 1603, and Jonas Poole, another of the Muscovy Company's captains, reported coal in King's Bay and in Bear Island in 1610. Whalers and trappers, no doubt, occasionally used it, but Spitsbergen coal attracted no attention before the nineteenth century, when about 1830 a sample cargo was carried by a small sloop to the Finmark iron mines. Nothing more came of this venture or of a proposal made in Russia about the same time to investigate the mineral possibilities of Spitsbergen. From time to time new discoveries of coal were recorded: many were made by Swedes in their frequent geological explorations, but it was Mr. James Lamont who discovered the valuable Tertiary

[1] *No Man's Land*, Sir Martin Conway: Cambridge, 1906. *Spitsbergens Natur og Historie*, Gunnar Holmsen: Kristiania, 1911.

coal beds near Advent Point in 1859. Dr. W. S. Bruce at a later date, realising the extent of the coal-fields, brought samples of coal to Edinburgh. The analyses were very favourable, but commercial men were too short-sighted to grasp the significance of these untouched coal-fields which could then be had for the taking.

The first claim to coal-bearing land was made in 1900 by a Norwegian firm in Advent Bay and Green Harbour, but little was done to develop the estate except the extraction of a few tons of coal which were sent to Norway as a sample. An attempt at mining had, however, been made in 1872 at Cape Thordsen, where a Swedish company had

Gypsum and Coal Measures, Spitsbergen.—(*Photo by Dr. W. S. Bruce.*)

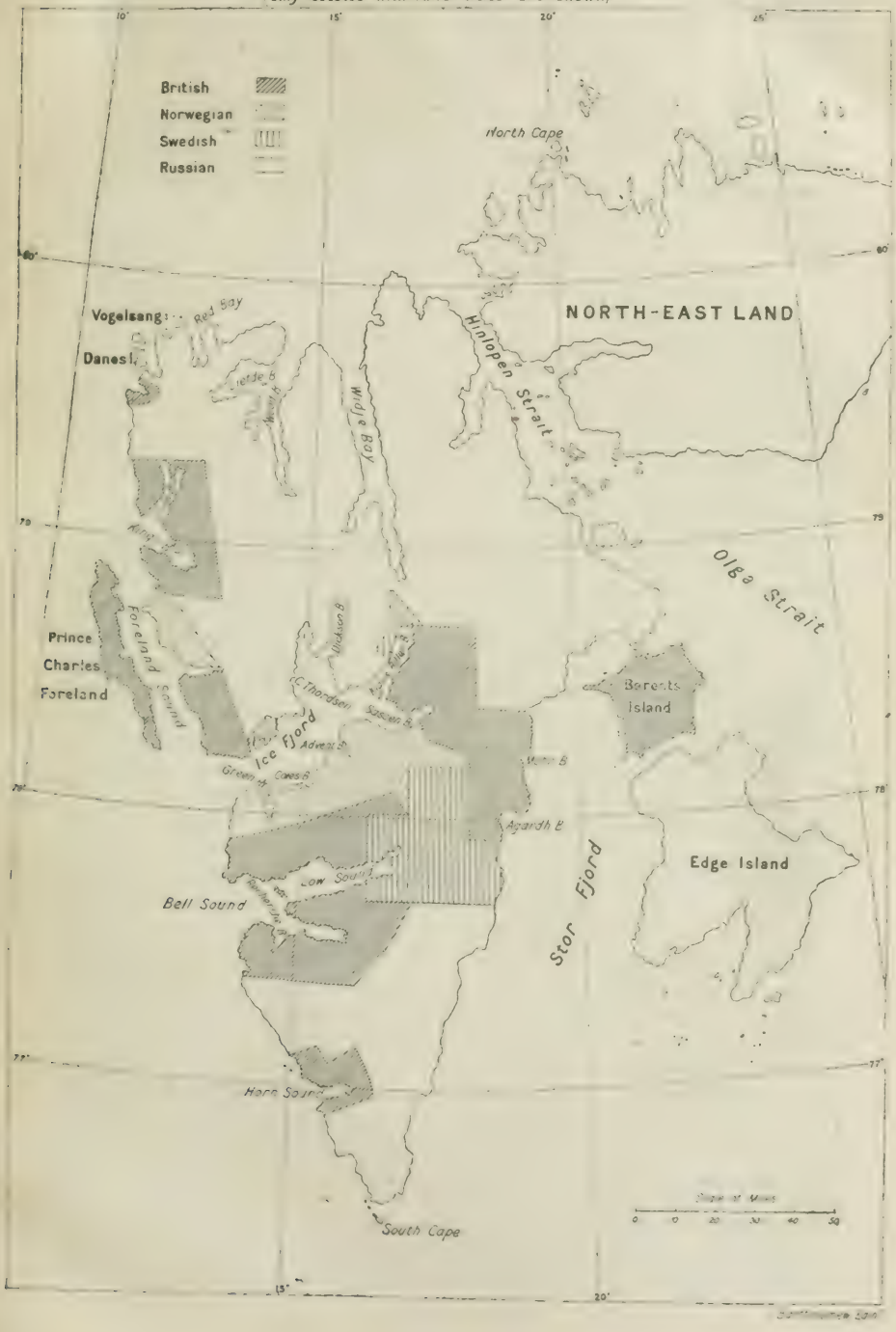
erected a house and workshops, and built a tramway to the sea, with a view to digging phosphatic nodules. The deposits proved valueless, and the settlement was abandoned the same year, the company being liquidated. The house was bought by Baron A. E. Nordenskjöld and Baron Oscar Dickson. It is important to note that the company was liquidated, as it disposes of the claim made by another Swedish company some forty years later that they had taken over the rights of the phosphate company. If Norwegians were the first to claim a coal-bearing estate in Spitsbergen they certainly took no steps to follow up their initiative. In 1900 Norwegians could have taken every coal bed in Spitsbergen without opposition, but they let the opportunity slip, and it was not until subjects of other countries had shown what could be

done that Norwegians again showed a practical interest in the country near their shores. In 1904 the Spitsbergen Coal and Trading Company of Sheffield took land at the north-east corner of Advent Bay, opened an adit into a seam of Jurassic coal, and built a settlement called Advent City. A great deal of capital was sunk in this mine in the installation of plant, etc., and in several years miners wintered. A little coal was exported, and some exploring and other vessels were coaled in the summer months. But the venture never prospered, and after an unfavourable report in 1908 by Professor A. MacWilliam of the University of Sheffield the mine was abandoned. Poor coal, serious faults in the beds, mismanagement, and competition of better coal across the bay, all contributed to this result. In the year 1904 the Trondhjem company across the bay sold its estates for a few hundred pounds to Messrs. Longyear and Ayer, two Americans, who formed the Arctic Coal Company of Boston, U.S.A. This company quickly got to work with true American enterprise. In previous papers in this *Magazine* and elsewhere the location of the mine and the progress of Longyear City have been described.[1] The American mine soon became the centre of Spitsbergen life and activity, and vessels could depend on obtaining coal there. The Arctic Coal Company claimed all the land between Advent Bay and Green Harbour, but at an early date abandoned their claims to the north-east of Advent Bay between the Sheffield estate and the Sassendal, and their claim to the Erdman tundra on the north of Ice Fjord. In Green Harbour the American claims clashed with those of the Green Harbour Coal Company and other Norwegian claimants who maintained a prior right. This dispute was never settled. Both Americans and Norwegians opened adits, and worked amicably side by side, their work being merely for the substantiation of their respective claims, and never developing beyond the experimental stage.

Meanwhile other parts of the west coast were not neglected. The Earl of Morton, on behalf of the Spitsbergen Mining and Exploration Company, in 1905 pegged out claims in Lowe Sound, at Cape Thordsen on the derelict Swedish claims, and in King's Bay. The Lowe Sound estate was the only one subsequently developed. There the company had a small number of coal miners for several years, but the export stage was never reached; ultimately the mine passed into other hands. Two other British companies appeared on the scene, and at present are the principal land owners in Spitsbergen. The Northern Exploration Company in 1908 acquired estates in King's Bay and Lowe Sound, and annexed in that and subsequent years estates on the east side of Cross Bay, in Recherche Bay, and in Horn Sound. At a later date this company claimed land between Osborne Inlet and Ice Fjord, but they have no estates in Ice Fjord. The Northern Exploration Company for several years concentrated its attention on marble quarries in King's Bay. It has now transferred its attention to Tertiary coal seams in Lowe Sound, and has great plans with regard to reported deposits of magnetic iron

[1] "The Commercial Development of Spitsbergen," R. N. Rudmose Brown, *Scottish Geographical Magazine*, November 1912.
"Spitsbergen in 1914," R. N. Rudmose Brown, *Geographical Journal*, July 1915.

SKETCH MAP OF SPITSBERGEN
SHOWING THE POSITION OF THE PRINCIPAL MINING ESTATES IN JUNE 1919
(Only estates with valid titles are shown)



ore in Recherche Bay. An expedition wintering on the Lowe Sound coal seams in 1918-19 is reported to have extended this company's estates. The former German claim on the west side of Cross Bay was annexed in 1918.

The Scottish Spitsbergen Syndicate was formed in 1909 to take over private claims held for some years. Its estates embrace the whole of Prince Charles Foreland, the land between Klaas Billen and Temple Bays, and between Temple Bay and Stor Fjord, as well as Barents Island. These territories have been surveyed and prospected by several expeditions. They contain enormous deposits of gypsum, as well as coal, magnetic iron ore, and oil shale. The discovery of oil shale, and possibly free oil, is the most important economic discovery made in Spitsbergen in recent years.

These two companies, which are the only British companies at present in Spitsbergen, each claim about 1800 square miles of territory. Together they own over one-seventh of the whole country, and this proportion seems likely to be increased this year.

Several other companies own mineral-bearing estates. These are all Norwegian and Swedish with the exception of one, which is Russian. The chief Norwegian company is the *Store Norske Spitsbergen Kulkompagni*, which in 1916 bought the estates of the Arctic Coal Company of Boston, U.S.A., and all valid Norwegian claims in Spitsbergen except those of the A/S Kulspids, which, however, are of little importance. The *Store Norske* Company have been pushing the development of the Longyear mine with the aim of exporting every available ton during the war, when, owing to the curtailment of the British supply, coal was very short and commanded a high price in Norway. In 1918 they managed to export about 50,000 tons, but promise double that amount this year. The *Norske Kulfälter* owns the former Sheffield mine in Advent Bay, and was reported to have moved Advent City farther up the bay, planning to mine an outlier of Tertiary coal instead of the Jurassic coal. Little seems to have been done, and the prospects are decidedly poor. In Bear Island the Norwegian *Björnoen Kulkompagni* since 1916 has been mining Carboniferous coal. The coal is poor, and loading facilities are bad: no doubt the venture will be abandoned before long. Meanwhile, however, a small settlement has been built. These Bear Island estates were first claimed by a German company in 1898 and 1899, but no actual work took place before the Germans abandoned the land in 1900. Another Norwegian company may be mentioned, although it has no right whatever to the mine it is working. That is the King's Bay Coal Company, which during the war jumped the British claim in King's Bay, where Poole found coal three centuries ago; it has already exported several thousand tons of good Tertiary coal. This is nothing but an act of piracy, for the British titles are incontestable; in fact, they are not denied by the Norwegians, who excuse their action merely on the score of opportunity.

In 1909 the Swedish geologist Baron de Geer drew the attention of the *Svenska Jernkontoret* (Swedish Iron and Steel Institute) to the coalfields of Spitsbergen. The *Jernkontoret* sent an expedition to Spits-

bergen the following year, and estates were taken in Mimers' Bay, off Klaas Billen Bay, at Cape Erdman in Ice Fjord, and at Braganza Bay, at the head of Lowe Sound. These estates were previously unoccupied or abandoned, so the Swedish claims were valid, but a further claim in Temple Bay trespassed on the estates of the Scottish Spitsbergen Syndicate, and had to be withdrawn at the request of the British Foreign Office. This company, which is now known as the *Svenska Spetsbergens Kolfalt*, has done a little work at Mimers' Bay, where the coal is Carboniferous, but in the main has concentrated its efforts on Tertiary seams in Braganza Bay. A small mining camp, jetty, and loading railway have been built there, but the bay is badly situated for easy access from the sea. To overcome this it has been proposed to build a railway across British territory to a part on the west coast. No doubt this is a practical scheme, but the institution of comparatively expensive land transport would rob the mine of one of the unique qualities of Spitsbergen mines, which is their proximity to the sea, and consequent cheapness of loading coal on board ship. The Braganza mine did not succeed in 1918, owing to difficulties of obtaining the requisite tonnage, in reaching its proposed export of 20,000 tons. Other Swedish companies of little importance are the *Konsortiet Sverige Spetsbergen*, which in 1917 took a small estate at the head of Klaas Billen Bay, and the Swedish Superphosphate Company, which, failing to find coal in 1918, took land in the vicinity of Dickson Bay with a view to mining phosphates. This venture suggests an echo of the Swedish failure of 1872 at Cape Thordsen. A few tons of rock were extracted in 1918 from the Triassic beds in the vicinity of Cape Thordsen.

Of the Scandinavian estates with valid titles, some 800 square miles are Norwegian, and some 350 square miles Swedish; that is to say, the total Scandinavian estates are about one-third of the area of the British estates.

Russian interest in Spitsbergen minerals first took active form in 1911, when the Russian Grumant Company took several small estates, most of which were already American and British property, but did nothing further. A second Russian company in 1912 acquired a strip of territory along the coast of Ice Fjord between Coles Bay and Green Harbour. The expedition sent to Spitsbergen in that year had failed to acquire land by purchase when it annexed this estate. There is some doubt whether the estate did not actually belong to the Americans, in which case it would now be Norwegian property along with the rest of the American estate. During the war the estate has been let, the feuar exporting several hundred tons of coal in 1917 and 1918. Russian estates cover about 60 square miles, but the validity of most of the titles is doubtful.

At the outbreak of war the only German territory in Spitsbergen was the site of the meteorological station in Ebeltoft Haven, Cross Bay, and a small area in the same bay claimed by the *Norddeutscher Lloyd* Company, apparently with a view to erecting an hotel. Attempts to buy mining estates had no more success than prospecting expeditions to unclaimed coasts. Germany never had any mining estates in Spits-

bergen, if we except the estate already mentioned in Bear Island, which was claimed for two years; now there is no German territory of any kind in Spitsbergen.

The question of titles to land is most important. So far the practice has been for a mining company, on taking land, to erect notices to that effect, and to notify their own Foreign Office, where the claim is registered, if no previous claim invalidates it. This notification constitutes the real title-deed, and the British Foreign Office several years ago promised British mining companies that their claims would be safeguarded. War conditions stopped the development of British estates, but on the other hand gave Scandinavian companies their opportunity; but these exceptional circumstances cannot be held to have invalidated British claims, even if the estates have been more or less neglected for some years. All titles to land of the two British companies named above are perfectly valid and beyond dispute. The same is true of the estates of the *Store Norske Spitsbergen Kulkompagni* and the majority of the estates of the *Svenska Spitsbergens Kolfält*, and certain other small companies already mentioned. But Spitsbergen has already attracted adventurers, and will probably attract more this year; complications are bound to ensue owing to attempts to jump claims. A land which is undergoing commercial development on a large scale can no longer remain a *terra nullius*; such a blissful state of freedom is incompatible with modern commerce.

Before discussing the political problem which Spitsbergen presents to-day it may be well to glance back at its earlier history.[1] Holland's original claim in 1596 and the annexation by King James VI. in 1614 were each valid in their day; the failure of the Dutch Company's protest against King James's action meant the lapse of Holland's claim. Denmark protested against Britain's annexation on a twofold basis: firstly, that Spitsbergen was part of Greenland and therefore Danish; secondly, that from time immemorial the King of Norway had been lord of the northern seas, and therefore was sovereign of the lands therein. The first contention was soon demolished, and the second was too vague and fantastic to have any weight. In any case it could not apply to a land which had not been discovered at the time the claim was made. When the whalers left Spitsbergen the rival claims were forgotten. Russia never claimed Spitsbergen in the days when Russian trappers colonised it, and neither Norway nor Britain protested against this settlement.

Attempts on the part of Norway-Sweden to discuss the political status of Spitsbergen in 1871 and 1899 were vetoed by Russia, who preferred the *terra nullius* to remain. After the separation of Norway and Sweden in 1905, Norway was more successful in raising the issue. In addition to Norway and Sweden, Russia was the only country which

[1] For the early history of Spitsbergen see *No Man's Land*, by Sir Martin Conway; "La découverte du Spitsberg," by Gunnar Isachsen in *Rés. des Campagnes Scientifiques par Albert Ier, Prince de Monaco*, vol. xl. p. 109, 1912; "Le Spitsberg dans l'histoire diplomatique," by A. Raestad, in *La Géographie*, vol. xxv. and vol. xxvi., Paris, 1912; and "Spitsbergen in Russian History and Literature," by A. F. Shidlovski (in Russian), in *Zapisok po Geografii*, vol. xxxiv. p. 205, 1912.

then exhibited any interest in Spitsbergen, although at one time the United States of America seemed inclined to press her claims. British claims were growing, and were already of importance, but the Foreign Office showed no inclination to support British pioneers.

Norway's proposals, which were first formulated in 1909, had a distinct bias towards Norwegian control, while purporting to maintain Spitsbergen as a No-man's land. But nothing was achieved, largely because of the mutual jealousy of Norway, Sweden, and Russia. The matter was not dropped. Subsequent conferences met in 1910 and 1912, and made such good progress that a larger conference, at which all States interested, including Great Britain, the United States, and Germany, were represented, met at Christiania in June 1914, in the hope of coming to a final decision. The discussions, however, were protracted, largely due to the obstruction of Germany, and no conclusions were reached when the conference broke up on the outbreak of the war in August.

The opening of the Peace Conference therefore saw Spitsbergen a *terra nullius*; what it will be at the close of the conference is quite another matter. It is mere pedantry to argue that any of the seventeenth-century claims to sovereignty have any value to-day or any bearing on the problem of the future sovereignty of the country. The British annexation of 1614 gives Great Britain no more hold than the vague claim of Norway to the discovery of Spitsbergen in the Middle Ages. Britain never revoked her claim, but never renewed it. Norway cannot prove her discovery of Spitsbergen, but that is immaterial, except as a matter of historical interest, for discovery is no criterion of ownership; and in any case the States which met at the conference table in 1914 did so on the distinct understanding that Spitsbergen was a *terra nullius*. That condition of adhesion to the conference nullified all previous claims. The slate is therefore clean, and the problem must be faced anew.[1]

There can be no doubt that some form of government backed by effective policing is essential in Spitsbergen: all mining companies are agreed on this necessity, and there is no one else to be consulted, since Spitsbergen has no inhabitants apart from the miners. The first problem to be faced is the constitution of this government. There is nothing to be said in favour of international control: that has been a failure wherever it has been tried, and if applied to Spitsbergen will merely postpone a real settlement and probably provoke a great deal of trouble. If absolute sovereignty is to be established the choice lies between Great Britain and Norway: Swedish interests are too small to rank in the same category as those of the other two countries. Russia, apart from her present chaotic state, has now no real interest in the country, and the United States' property, as already mentioned, has been sold to Norwegian owners.

[1] Among papers in discussion of the problem, see "La Question de la souveraineté des terres arctiques: (i.) Spitsberg; (ii.) Ile d'Ours," by R. Waultrin, in *Revue générale de droit international public*, nos. 1 and 2, Paris, 1908, and "A Unique International Problem," by R. Lansing in *American Journal of International Law*, vol. ii. p. 763, 1917.

Sentiment in Norway is greatly in favour of annexation by Norway. Her stake in Spitsbergen is considerable, although entirely of recent origin. From 1909 onwards there have been survey expeditions in Spitsbergen every summer largely at the expense of the Norwegian State. Major Isachsen, Captain Staxrud, and others who took part in those expeditions have now completed several detailed maps of the western half of the country, excepting Prince Charles Foreland, which was mapped in great detail by Dr. W. S. Bruce. In 1911 Norway erected a high-power wireless station in Green Harbour. It is kept open winter and summer, and also serves as a post-office, the mails being carried in summer at irregular intervals to and from Tromsö by a subsidised vessel. Norway has even spoken of a church in Spitsbergen. The Norwegian State in all these endeavours has spent a great deal of money for which she can expect no direct return, but which has greatly strengthened the claim of Norway to the control of Spitsbergen. On the other hand Norwegian estates, except those of the *Store Norske Spitsbergen Kulkompagni*, are of small account; all are of recent acquisition.

The claims of Britain to a controlling voice in Spitsbergen affairs are based on her pioneer work in mining, the extent of British estates (nearly three times the area of all other estates combined), the variety of minerals on British estates, and the possession of practically all the good harbours on the west coast, which is the important coast. Probably as much or more capital has been expended by British companies as by Scandinavian companies, but Great Britain has spent no State funds on the development of the country; pioneers have been left to do the work at their own risk and with scant official encouragement.

The difficulty in solving the problem of control lies not so much in deciding what State shall be given the mandate as in devising adequate safeguards for the pre-existing estates belonging to the nationals of other countries. Obviously companies which have been in Spitsbergen for many years cannot be expected to submit to control prejudicial to their interests: they will not submit to laws which hamper their operations, especially if those laws emanate from a State other than their own. Unless the controlling hand rests lightly in Spitsbergen, either British or Norwegian estates will have to be extra-territorial in so far as they ante-date the new order of things.

Probably the happiest solution will lie not in granting any State perpetual sovereignty over Spitsbergen, but in giving a mandate to that State to administer the country. Such an arrangement is most likely to secure equitable treatment for all. Coupled with this must be the establishment of adequate safeguards, as suggested above, based on the principle of extra-territoriality for the companies of other States. If some such scheme could be instituted, Spitsbergen has a bright future before it in economic development.

A great deal of attention has lately been drawn to the resources of Spitsbergen, largely owing to a totally erroneous rumour in the press last autumn that Britain had annexed the country. The resources are considerable both in minerals and building stones, and in fur. About fur,

little need be said, since the hunting of fur-bearing animals, reindeer, foxes, and polar bears, at least in the more accessible parts of the country, will not again be profitable occupation until some game laws have been instituted which will allow the game to recover from the excessive slaughter by so-called sportsmen and Norwegian hunters.

The mineral resources have been incidentally referred to already. It is convenient to summarise our present knowledge. Minerals include

Oil-bearing Rocks in Spitsbergen.—(*Photo by Dr. W. S. Bruce.*)

coal, iron ore, copper ore, oil shale and possibly free oil: further examination will probably reveal others. The coal is Carboniferous, Jurassic, and Tertiary. All these kinds occur in enormous quantities and mostly in seams easily worked within a few hundred yards of deep water anchorage. The Tertiary coal is the best, and in practice has been proved to be excellent steam coal. Swedish geologists have estimated the amount of coal in Spitsbergen at over 8,000,000,000 tons. Both British companies own large coal-fields. Magnetic iron ore of high quality has

recently been discovered on the estates of the Scottish Spitsbergen Syndicate and the Northern Exploration Company; these deposits have to be further explored by experts this summer. As far as it is known this high-grade ore does not occur on any Scandinavian estate. The Scottish Spitsbergen Syndicate's estates also contain enormous quantities of pure gypsum and some promising oil shale. Those of the Northern Exploration Company contain asbestos and molybdenum and copper ores. Marble of fine quality occurs on several British estates; the Northern Exploration Company used to work it in King's Bay.

An essential need in Spitsbergen mining to-day is the adequate examination of the estates by qualified geologists and mining engineers. Trustworthy reports from men of standing are required in order to give sufficient confidence to allow the development of a country which suffers in reputation from its far northern position, its association with the Arctic regions, and its anomalous political status.

Markets for Spitsbergen products are near at hand. Norway produces no coal, and Sweden too little to meet her own requirements. Finland has no coal and northern Russia has to get her coal from the heart of the country. The Lapland Railway, the new Murman Railway, the projected Finnish Arctic Railway, and the new route by the Kara Sea to Siberia, will all increase the demand for coal in northern Europe. Iron ore of high grade, and oil, as well as the other ores mentioned, will always find a market. It is true that vessels going north to load must sail in ballast, but it must be remembered that this will facilitate and cheapen the import of stores and mining material to Spitsbergen, and so will not be dead loss. Lastly it should be noted that Spitsbergen is much nearer to Europe than the average map, on Mercator's projection, leads one to believe. The following are certain distances in nautical miles:—

Norway to Spitsbergen (land to land)	350 miles
Tromsö (Norway) to Ice Fjord	520 miles
Murmansk (Russia) to Ice Fjord	640 miles
Aberdeen to Ice Fjord	1300 miles

TRAVEL MEMORIES.

By Lieut.-Colonel A. C. Yate, F.R.G.S., F.R.Hist.Soc.

(With Illustrations.)

If memory serves me right, I have, in an earlier passage of these "Memories," confessed myself a votary of "the charm of Persia." The secret of that charm, however, lies in the land, and not in the people, as we know them to-day. Persia is a land replete with the romance of history; and, if we seek to analyse the "charm" with which nature has endowed the country, we seem to find the key to it in "contrast." It so happens that it was the scenery which I am about to describe in this paper—scenery through which my brother and I rode on the 14th and

15th of June 1881—that first really aroused in me the feeling that nature had not been unkind to Persia. My pen of thirty-eight years ago has done but scant justice to it; but such as that attempt at appreciation is I must fain reproduce it here. Of Persian history and life the romance may be sought alike in ancient authors, Greek and Persian—Herodotus and Xenophon, Arrian and Procopius, Firdausi and Sa'adi: and in the works of modern writers, to wit, Morier's *Hajji Baba*, Malcolm's *Sketches in Persia*, Baillie Fraser's *Kuzzilbāsh*, and Mortimer Durand's *Nadir Shah*. Strong hold as Persepolis and its entourage and the Shāpur sculptures took upon my imaginative faculties, the fascination of Kalāt-i-Nadiri took even a stronger hold. My admission by the Governor in June 1885 to a three days' visit was a stroke of good fortune for which I have ever been grateful. In 1886 the Shah, alarmed by the ever-growing activity of the Russians in Trans-Caspiana, upon the steppes of which the northern cliffs of Kalāt-i-Nadiri look out, issued orders that in future no foreigner was to be allowed inside his greatest natural fortress. The very conformation of this work of nature is a marvel, and the personality of that self-made man and monarch, Nadir Shah, seems to pervade every corner of it. The little village of Gugumaz snuggles in a ravine within the sixty-miles circuit of precipice which nature has prescribed to be its ramparts. There I spent three days, visiting the tanks and other traces of Nadir Shah's sway, and riding away to the northern border to look down upon Russian Central Asia. My host was most courteous and friendly, and, like most Persians, a good conversationalist, endowed with a fund of humour. But he had a keen eye, and when he realised that, as Robert Burns puts it, "a chield 's amang us taking notes, and, faith, he 'll prent it," my pen and ink were both missing the second morning, when I came back from my ride or walk. I continued my notes in pencil.

When I finally made up my mind to "prent" those "notes," I was already (in Aug. and Sept. '86) under orders for Burma. The Burmese rebel or patriot needed suppression. So I packed all the material for my forthcoming book off from India to Edinburgh, and left it to Mr. Alexander Allardyce, the author of that excellent picture of Indian life "The City of Sunshine," to build up the book. For what he did he has my grateful thanks, although he has long ago passed to a world where mere mundane gratitude is probably at a discount. "Kalāt-i-Nadiri" he seemingly barred as being outside the scope of a volume which professedly dealt with the Afghan Boundary Commission, so my "notes," though "prented," lie *perdus* in *The Daily Telegraph* of August 1885. Some day I hope that they once more see the light.

"The charm of Persia," I have said, lies in the land, not in the people. Of this the Persian Deputation at Paris is a signal instance. I will not repeat what I wrote in *The Nineteenth Century*, nor will quote from *The Times*' leader of the latter part of April. The present-day pretensions of Persian politicians are in the precise inverse ratio to their deserts. The so-called Peace Conference of Paris has been the dumping-ground for every claim that is calculated to provoke discord; and conspicuous among these agitators have been the dependencies and protectorates of

the British Empire. With Ireland and India we have no concern here, but alike in the conduct of Persia and Egypt we have flagrant cases of base ingratitude. A timely answer to Egyptian arrogance was President Wilson's public recognition of Britain's Protectorate, and a not dissimilar reply will doubtless be administered to Persia. The sacrifices which Britain has made for Persia in the last decade would, if committed to print, fill a small volume; but the sacrifices for which atonement cannot be exacted are those of the lives of officers like Captain Eckford, and of consular officials. When Sir Percy Sykes was at last sent out to keep south-east Persia quiet, that was done which had been some years previously recommended by the political officials of Baluchistan and the Persian Gulf. As for the Nushki Railway, which might have been constructed twenty instead of two years ago, its belated appearance in 1916 has admittedly been the salvation of the situation, both in eastern and south-eastern Persia and along the Trans-Caspian Railway. Since Colonel Webb Ware delivered before the Central Asian Society in February last his excellent lecture on this railway, public thought has naturally turned upon its future extensions. That, however, is not a subject upon which I will embark now. Let it suffice to conclude this reference to the first railway connecting India with Persia by quoting the words of a letter received by me to-day (1st May 1919) from one who paved the way for its construction :—"I was told the other day in a private conversation by ——— that the services that this railway to the Perso-Baluch Frontier had rendered during the last year or two of the war were such that he was inclined to believe that even I was unable to fully appreciate them." When I think of Indian troops led by British officers controlling, in the country once subdued by Skobeloff and ruled by Kuropatkin, this Trans-Caspian Railway constructed under the noses of the Afghan Boundary Commission, in 1884-86, by Annenkoff, and reflect that the Nushki-Duzdab Railway enabled them to do so, I can but marvel at the dispensations of destiny. A lapse of thirty-eight years has seen Persian despotism give place to "constitutional" anarchy, and Russian absolutism humbled in the dust before the brutality of Bolshevism. In 1917 Persia thought that Germany was going to dictate peace terms, and sent its deputies to Brest-Litovsk. The Peace Conference of Paris will not, we presume, forget that, when the Persian deputies appear before it. Of the extravagance of their pretensions the Press informed the world some months ago.

I claimed "contrast" as the keynote to the "charm of Persia." That note pervades the passage which I am now about to quote from my Diary of 1881, describing the route from Murchakhwar to Kum.

"At 3.15 P.M. we left Murchakhwar *en route* for Soh (14th June), and reached Bidashk, the post-house five miles east of Soh, at 6.15 P.M., the distance being reputed six farsangs or about twenty-one miles. Our horses were indifferent. Murchakhwar is 5400 feet above sea-level, and Soh 8000 feet; consequently the road rises gradually all the way, traversing a broad plain, barren and uncultivated, a mere waste dotted with stunted shrubs. About half-way we passed an 'āb-ambār,' *i.e.* a covered reservoir, and on reaching the hamlet of Dehlūr, some three

miles from Bidashk, we entered a narrow and more fertile valley, watered by a stream of clear and good water. The barren tracts that we had passed through abounded in sand-grouse. After refreshing ourselves at Bidashk with copious draughts of pure, cool water from a 'kuza' (porous earthenware bottle), a few biscuits and a pipe, we mounted fresh horses and started for Soh. Our five miles' ride was really a pleasure, tired though we were with a ride of seventy miles under a hot sun. The valley we traversed was richly cultivated with fields of grain, and orchards stocked with walnut-trees and every

Telegraph Office at Soh. Sergt. M'Gowan, R.E., of the Indo-European Telegraph, his son and servants. About 1885.

variety of fruit-tree. Streams of delicious, clear, cool, rippling water flowed over or by the side of the road. After the barren tracts from Gaz to Bidashk, this luxuriance of verdure was indescribably charming to the eye and seemed to awaken within us new life and spirits.

"About 7.30 we reached the telegraph-house at Soh, just as night was closing in, and were welcomed with all hospitality by Sergt. M'Gowan, R.E. So cold was the night that we were only too glad to have a liberal covering of quilts and blankets. There is a fair karwansarai at Soh, but no chāpārkhana; consequently, in accordance with custom, we had to pay one or two karans extra for the grain, fodder, and stabling of our post-horses for the night.

"We left Soh at 4.30 A.M. on the 15th June, and rode for about a mile

through orchards and cultivated lands similar to those whose beauty had so enchanted us on the previous morning. The freshness of the morning air was most exhilarating, and we thoroughly enjoyed our ride till ten o'clock, when we debouched from the defiles of the mountains into the plain of Kashan and encountered a scorching wind like the blast from the furnace of an iron-foundry. It was almost like a sudden transition from Paradise to Tartarus, if we accept the popular notion of those two regions of our unknown future existence. After leaving the cultivated lands of Soh we traversed a rough and hilly road for twenty miles to Kohrud.

"We saw two fine ravine-deer, the buck standing still about a hundred yards from the road, and as it were courting a bullet from a rifle, had we but had such a weapon with us. Between Soh and Kohrud we crossed the highest mountain pass on the road between Bushire and the Caspian, the elevation above the sea being about 9000 feet. Just above us, *i.e.* from 1000 to 2000 feet above the pass, huge beds and drifts of snow lay on the mountain side, or in its rifts and crevices, their sparkling whiteness lying encircled in a ring of bright green verdure that drew its vitality from the slowly decaying life of the snow. Some two miles from Kohrud we passed a number of springs of beautifully cool and clear water, rising out of the soil and coalescing into a stream which first irrigates the lovely vale of Kohrud and then collects in a vast artificial reservoir constructed in the defile ten to twelve miles below that village, whence a portion of the water supply of Kāshān is drawn.

"We rested at Kohrud for half-an-hour, the chapparchi very civilly obtaining for us a large bowl of milk; for we felt that we needed something more substantial than water to wash down our biscuits and strengthen us for a five hours' ride to Kāshān. We left Kohrud at 8 A.M. With the exception, perhaps, of the valley of the Safed-rud, near the Caspian, I saw no spot in Persia that could compare with the vale of Kohrud and its neighbourhood for beauty of scenery. I am told that amid these mountains many such lovely vales are to be seen by the traveller who has leisure to deviate from the direct road. However, I feel grateful for having seen one such lovely spot, and it is one that, as long as I live, I shall recall with delight. In my travels through Persia I have recorded in my memory the following spots as those whose attractions should not be forgotten, viz. (1) The Kohtal Pir-i-zan with the Dasht-i-barr, Dasht-i-arjūn and the splendid mountain range amid which these valleys lie embedded; (2) Soh and Kohrud; (3) the slopes and ravines of the Elburz range above Tehran; (4) the glorious mountain and woodland scenery of the Safed-rud near Kawām-ābād. For a distance of four or five miles the vale of Kohrud is one garden of fruit-trees and cultivated fields. The road winds for some miles down a narrow stony lane that is evidently as often a roaring torrent as a dry roadway, and is shaded on either side by walnut and other trees[1] that

[1] I noticed the hawthorn at Kohrud (also on the Kohtal Pir-i-zan), and at Murchakhwar I remarked a solitary hazel-bush in a private garden.

even at mid-day would render powerless the rays of the sun. At this altitude, in the coolness of the morning air, it was a true luxury to ride along leisurely amid such surroundings. After we emerged from the shade of this avenue we rode for two or three miles through rich fields of grain, while at intervals on either side picturesque little vales and ravines, carpeted with fields and gardens, and each watered by its own rivulet, offered a series of charming vistas to the eye. Finally the cultivated valley narrowed into a barren rocky ravine, although the merrily flowing waters of the stream that danced gaily past us seemed to bear away with it that sense of weariness which is engendered by travel's monotony.

"Ten to twelve miles below Kohrud we passed the reservoir alluded to above, formed by the construction of a dam of great thickness[1] and fifty or sixty feet, if not more, in height, the outlet for the water being through a small culvert at the base. Thence water is conveyed by a partly natural and partly artificial channel to Kāshān. During the flood-season the surplus water evidently poured over the top of this massive dam. Some three miles below it the road emerged into the plain of Kāshān. It was then 10.30 A.M. (15th June). Before our eyes stretched a large arid plain either fading out of view in the distance or bounded by low barren ranges of hills and mountains. Before us we saw the road winding downward to the town of Kāshān, which lay half concealed in the shimmering vapour that floated above the scorched and arid soil. What a weary way off it looked as the burning blast of a desert wind blew in our faces, and warned us of the dreary journey before us. However we felt it was an evil that could not be shunned, and that would be best mitigated by our own energy. So we pressed on our weary ponies over hill and dale, amid stones and boulders, our thoughts being wholly engrossed in one purpose, viz. to reach Kāshān as soon as possible.

"From Kohrud to Kāshān is little short of thirty miles, and to ride that distance on one and the same horse is, if trying for the rider, still more irksome for the animal. I would infinitely rather ride from Kāshān to Kohrud, for at each step the heart grows lighter. Riding as we did at a canter down stone-strewn slopes, I marvel at and respect the sure-footedness of our ponies.

"At 12.30 we reached the telegraph station safe and sound, and seldom have I felt more thankful to gain shelter from the sun's rays. How refreshing was a cup of green tea *à la Perse* and a copious draught of iced water; for in Kāshān ice or frozen snow is a *sine qua non* even for the natives. Our host at Kāshān was Mr. B. W. Stainton, with whom I have had the pleasure of renewing acquaintance in more recent years. After a good wash in the 'hammam' we partook of breakfast, and then, despite the oppressive heat, forgot our weariness in sleep till eventide.

"Viewed from a distance Kāshān appeared to be a town of considerable size, and doubtless it is so; but during our stay there, owing to the excessive heat and the fatigue engendered by previous travel, we had not

[1] Earth faced with masonry, and 20 or 30 feet thick—perhaps more at the base.

the energy to wander all over the town. The supply of water seemed to be abundant both for domestic uses and for irrigation; I remarked that fruit was abundant, and that trees abounded both in and around the town.

A Minaret in or near Kāshān. About 1890.

The blue-tiled domes here rising above the ordinary level of the houses at once attract the eye, and indeed we might have made a similar remark with regard to Murchakhwar and Kohrud. Seeing that we were detained at Kāshān till 6 P.M. on the 16th of June, owing to the simultaneous arrival of the Isfahān and Kirmān mails, we could not but

regret that we had not halted at Kohrud till the afternoon of the 15th and ridden into Kāshān as the shades of eve were falling.

"We had intended to visit the palace of Fin, distant some five miles from Kāshān, but what with heat and physical fatigue we felt unequal to the exertion. It is in itself worth seeing for its gardens and tanks of crystal water. Viewed from the roof of the telegraph house in Kāshān, the edifice, reposing amid a profusion of verdant trees, looked picturesque. It was here that the present Shah, Nāsir-uddīn, put to death his first Prime Minister, the Amir-i-Nizām, a man of great ability, from motives of jealousy. Sir Henry Rawlinson (*England and Russia in the East*, pp. 82-4) condemns his murder in words which appeal to our sympathy. 'The story of the disgrace and death of the Amir-i-Nizām is one of the saddest that occurs in the whole range of Persian history. Every evil passion, every miserable motive, jealousy, selfishness, perfidy, and hatred, seem to have combined to cause the death of this really extraordinary person, who was far in advance of his age and country, the only redeeming feature in the tale being the devotion of his royal wife, who watched over the doomed man like his guardian angel and was only ultimately overreached by the cruelest of frauds. The death of the Amir-i-Nizām early in the year 1852, shocking as it appeared to the nations of Europe, and arresting as it also did the onward march of progress and improvement in Persia, was still more disastrous in its effects on the external political relations of the country.' Kāshān is probably the hottest place in central Persia. Its elevation above sea-level is about 2500 feet, much lower than that of Tehran, Isfahān, and Shiraz. Moreover, it lies in the midst of a barren country on the western borders of the Kavir or Great Salt Desert, and yet amid the mountains, within a few miles of Kāshān, such cool and lovely spots as Kohrud exist. At Natenz, about 30 or 40 miles south-east of Kāshān, the finest pears in Persia are said to be grown, and around Kāshān too are produced the finest Persian melons. Viewed from the roof of the telegraph station, Kāshān appeared to be of much the same size as Shiraz. Many Persians of rank and wealth are said to live here, and appear to be by no means averse to associating with Europeans. Manufactures in silk and copper are carried on here extensively. We invested in a few dozens of the silk handkerchiefs of local manufacture. Looking over this town at eventide the eye was caught by three blue-tiled domes of mosques with their concomitant 'guldastas'[1] and, as the sun sank below the horizon, the voices of the muezzins fell faint on the ear, as they called the faithful to prayer. Some of the streets in Kāshān are paved with big cobbles, and anything more painful either for walking or riding cannot be imagined.

"We left Kāshān at 5.45 P.M. on 16th June, taking with us an Armenian, in place of the shāgird-chapar. Subsequently we had every reason to regret our folly in thus engaging a stranger in our service from philanthropic sentiment. His wish was to get to Tehran without expense, but he proved quite unequal to the fatigue of travelling as we

[1] "Guldasta," literally a nosegay, is the term commonly applied in Persia to the minarets from which the faithful are called to prayer.

travelled. As he was said to have been previously in the service of Europeans, we thought he would be of material assistance to us in cooking, packing, etc., whereas on the contrary we found him to be a mean-spirited cur who had neither the pluck to ride hard nor the will to assist. Our animals, having travelled to Sinsin and back within twenty-four hours, were thoroughly tired. However, by dint of stick and spur we covered the six (reputed) farsakhs (21 miles) in three hours twenty-five minutes, and reached Sinsin at 9.10 P.M. We got here some eggs, bread, and mast and indifferent water, and having satisfied hunger slept till 2 A.M., despite the sultriness of the weather, the swarms of mosquitoes, and the dirt and unpleasant odours of our quarters in the chapparkhana. The whole of the country between Kāshān and Tehran may be briefly put down as barren and uninteresting, if not repulsive, to the eye. Such a thing as good water does not exist. Such water as there is—and it is all more or less brackish—is obtained from wells or tanks. There is a kārwān-sarai at Sinsin. Leaving Sinsin at 2.50 A.M. we reached Pasangān at 6.10 A.M., a distance estimated at seven farsakhs (24 miles). Our horses were utterly exhausted at the end of the stage. Leaving Pasangān at 6·30 we reached Kum[1] at 8.35 A.M. (4½ farsakhs)." [2]

The towns of Kāshān and Kum assume a very different aspect to-day from that which they offered in 1881. Thirty-eight years ago Persia did not seem to suggest railways. Now, with the Nushki line terminus at "Duzdab,[3] a small plateau of immense strategic importance in the Sarhad hills," to quote the words of one who knows the Perso-Baluch frontier intimately, the railway practically completed from the Bosphorus to the Shatt-el-Arab, Tiflis and Tabriz almost if not quite united by rail, and a railway service linking the Trans-Caspian and Turkistan steppes to Orenburg and Krasnovodsk, extensions from these several systems into and across Persia become a mere question of time and of capable administration on the part of the Persian Government. The subject is too large to embark upon fully here, but a glance at the map will show that when the Nushki railway is prolonged to Tehran, *via* Bam, Kirmān, and Yezd, it will strike the Shiraz-Isfahan route at Kāshān, and that Kum is an important centre upon which roads from Hamadan, Kirmanshah, Burujird and Khurramabad converge. That Baghdad and Isfahan will be sooner or later united by a railway, and equally so Quetta and Mashhad *via* Sistan, is regarded as a certainty.

If Afghanistan under the Amir Amanullah Khan still "shies at" railways, the line skirting its western frontier will draw trade assuredly from Herat and all the Amir's western territories. A railway that has reached Mashhad will not be long in continuing itself to Askhabad or Sarakhs, and so tap the trade of Russian Central Asia. With the terminus still at Duzdab or Dozab Indian troops have been for a year past fighting Bolshevism between Merv and Charjui. In *The Times* of 7th March 1919 (p. 9) appeared an admirable picture of life among the Anti-Bolshevist Russians and Turcomans at Anankovo, fifty miles

[1] About Kum see Malcolm's *History of Persia*, vol. i. p. 576, and Binning's *Persia*, vol. ii. chap. xxviii.

[2] Extract from *Diary* of 1881.

[3] Spelt Dozab in Curzon's map of 1891. It is 20 miles south of Kuh-i-malik-siyah and four or five roads meet there.

north-east of Merv. The article, entitled "The Real Merv," concludes with a scene descriptive of "the way these Menshevist officers, many of them Royalists at heart, wear the garb of democracy."

Since this paper was begun, Afghanistan has embarked upon a war which an Afghan student at the University of Edinburgh styles "at once grave and ridiculous and needing immediate care and delicate handling." Time enough, then, to consider Afghan railways when war is over.

I may add that the excellent news that Major F. Bailey, about whom some anxiety had existed, was alive and well two months ago has been received. The Royal Scottish Geographical Society has special grounds of interest in the welfare of an intrepid traveller, in whose breast she may well claim to have implanted the seeds of the passion for exploration.

THE ANCIENT SEA AND LAKE BASINS OF CENTRAL ITALY.

By C. S. Du Riche Preller, M.A., Ph.D., M.I.E.E., F.G.S., F.R.G.S., F.R.S.E.

Continued from p. 190.

For Map and Diagram see the May issue, pp. 178 and 183.

2. The Arno Basins.

The river Arno has its sources in the Tuscan Apennines on the southern flanks of Monte Falterona (1654 m.),[1] not more than 30 km. NE. from the sources of the Tiber on Mte. Fumaiolo. The sources of the Arno, *i.e.* the Arnino and the Capo d'Arno, rise at 1360 m. altitude, 284 m. below the summit. In contrast to the permeable Miocene sandstone of the Tiber sources, those of the Arno lie in the impermeable Eocene flysch sandstone formation of the Apennines, which is poor in springs but rich in rapidly denuding and descending surface water. It is this surface water which causes the sudden rises of the Arno in the valley, and, being then charged with enormous quantities of yellow soil in solution, becomes the "golden" Arno of Florence and Pisa.

Casentino.—About 14 km. below its sources the Arno enters at Stia (400 m.) the classic Casentino basin, which extends for 15 km. in a width of 3 km. to Poppi and Bibbiena (375 m.), at the foot of the steep mountain side on which stand the famous hermit convents of Camaldoli and La Verna (1116 m. and 1280 m. respectively).[2] The Pliocene

[1] Dante (*Purg.*, xiv. 16):

"Per mezza Toscana
Un fiumicel che nasce in Falterona
E cento miglia di corso non sazia."

[2] *Ibid.* (*Inf.*, xxx. 65): in reference to the ravines of the Archiano and Corsalone, which lead to the two ancient Eremo (hermit) convents, founded by St. Romuald in 1012, and by St. Francis d'Assisi in 1215 respectively:

"Li ruscilletti che da' verdi colli
Del Casentin discendon giusi in Arno."

Both convents are practically on the crest of the Apennines, that of La Verna being

deposits skirt the margin and slopes of the basin on the left up to 600 m. altitude or 200 m. above the valley floor, and contain lignite bands up to 6 feet in thickness. The Pliocene floor of the basin is overlain by Quaternary deposits, so that the original Pliocene lake basin must have been over 200 m. in depth.

Arezzo.—From the Casentino basin the Arno descends through a defile 20 km. in length to the plain of Arezzo (215 m.), whence its natural, southward course to the Chiana Valley and the ancient sea at Chiusi was abruptly diverted in the opposite (N.W.) direction into the S. Giovanni basin.[1] In Pliocene times the plain of Arezzo was the connecting link between the two basins just mentioned, and the three constituted a great continuous lacustrine basin over 100 km. in length, SE. to NW., exactly parallel, and similar to the Tiber basin. These two thus formed the great longitudinal troughs of the Tuscan and Umbrian Apennines due to the Pliocene subsidence.

Val di Chiana.—The Val di Chiana basin, bounded on the east by the hills of Arezzo and Cortona, on the west by those of the Chianti and Montepulciano regions, extends from Arezzo to Chiusi, 60 km. in length and 15 km. in width, covering an area of 900 sq. km. (370 sq. miles). To this must be added, as originally an integral part at its south-eastern end, the basin of the present Lake Trasimene, which is almost circular in form, measuring 12 km. in diameter or about 150 sq. km. (50 sq. miles). The southern end of the Chiana basin, at the lakelets of Montepulciano and Chiusi, is 250 m., its northern end, at Chiani, west of Arezzo, 215 m. in altitude; its mean level is therefore 235 m. above sea-level, while Lake Trasimene lies at 259 m. altitude.

The history of this whole region is one of great hydrographic and climatic changes. In Pliocene times, the lacustrine expanse communicated with the Subapennine sea south and west of Città della Pieve and Chiusi. The Quaternary uprise severed that connection by the recession of the sea, and the deposits of that period gradually formed a bar near Chiusi, owing to which the drainage was reversed to the north and the basin converted to a lake. In early historic times this lake, whose level was constantly being raised by alluvial deposits, gradually shrunk to a great marsh, traversed by the sluggish river Chiana, which discharged into the Arno west of Arezzo, the latter having itself been wholly diverted NW. into the S. Giovanni basin, as previously mentioned. The Chiana basin continued to be a malaria-infested region up to the fourteenth and even up to the eighteenth century,[2] when it was finally

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sheltered by the huge Miocene sandstone cliff or cap 250 m. above it, similar to that of Mte. Fumaiolo. The crest commands a view of both the Adriatic and the Tyrrhenian Sea. Dante speaks of it as "Il crudo sasso intra Tevere ed Arno" (*Parad.*, xii. 106).

[1] The deflection was probably caused by the low Eocene bar across the valley near Chiani, west of Arezzo, in conjunction with the constantly increasing deposits of the Chiana after its reversal S. to N.

[2] Dante stigmatises the fever-haunted districts of Val di Chiana, of the Maremma, and of Sardinia in *Inferno*, xxix. 46:

"Qual dolor fora se degli spedali
Di Valdichiana tra 'l Luglio e Settembre
E di Maremma e di Sardigna i mali
Fossero in una fossa tutti insembre!"

drained by the construction of the *canale maestro*.[1] Since the completion of that beneficent work the Val di Chiana has become not only salubrious, but one of the most fertile valleys of Central Italy.

The Pliocene deposits at the southern end of the basin reveal a distinct superposition of lacustrine on marine formations, more especially on the valley floor, while in the hillocks which flank the central canal on either side, and on the marginal slopes of the basin, the deposits are only lacustrine and occur up to 350 and 400 m. altitude, thus pointing to a depth of the lake of at least 200 m.

Lake Trasimene.—Closely related to the history of the Val di Chiana is that of Lake Trasimene as a surviving remnant of the great Pliocene lacustrine expanse. Its original western exit into the marine belt near Chiusi having been closed by the Quaternary bar across the Chiana basin, the lake became a self-contained unit, but of much larger extent than at present. This is evidenced by the deposits up to 100 m. above its present level in the hills bordering it on the north, south, and east, including the Magione ridge which separates it from the Tiber basin of Perugia and Todi.[2]

S. Giovanni, Val d'Arno.—A few kilometres west of Arezzo the Arno cuts the low Eocene spur of Ponte Buriano (209 m.), and enters the large ancient lake basin of S. Giovanni, also called Val d'Arno. It is 45 km. in length and 10 km. in width, its superficial area of 450 sq. km. (173 sq. miles) being about half that of Val di Chiana. It forms a trough between the Pratomagno (Vallombrosa) range of the Apennines (1592 m.) and the Chianti Hills (893 m.), which separate it from the Subapennines. Its present valley floor, 200 m. in altitude at its upper, 120 m. at its lower end, as well as the hill-slopes on either side up to 350 m. altitude, are entirely covered by Pliocene lacustrine deposits. These also extend through the side valley of the Ambra to the ancient marine belt of the Subapennines west of the Chianti Hills, thus showing the communication of the ancient lake with the sea at that point.

The S. Giovanni basin owes its reputation as classic Pliocene ground alike to the curiously broken-up character of its Pliocene deposits, to the wealth of its Pliocene fossil flora and fauna, and to the extent and origin of its remarkable lignite beds.

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[1] The *canale maestro* drains the two lakelets of Chiusi (252 m.) and Montepulciano (249 m.), and thence follows the talweg of the ancient Chiana lake at a gentle gradient of 1 in 1000. At its lower end, near Chiani, it traverses a low Eocene spur, and then crosses the Arezzo plain, and joins the Arno near Ponte Buriano.

[2] Lake Trasimene formerly drained west into the Chiana basin, but since the fifteenth century it has drained east by an overflow canal into the Nestore, a tributary of the Tiber in the Perugia-Todi basin. To prevent floods by sudden rises of the lake, two of its former affluents, the Tresa and Maggiore, were diverted to the Chiana basin. The present new canal of 1897 utilises an old tunnel; it maintains the ordinary level of the lake, 6 m. in depth, and regulates the difference between rainfall and evaporation. Napoleon I. projected the total reclamation of the lake area, but this and other more recent schemes failed owing to the excessive cost. The reclamation of Lake Fucino, in the Abruzzi, of similar size, carried out by Prince Torlonia, 1855-1875, cost £1,700,000.

The crushing defeat of the Roman army, under the Consul Flaminius, by Hannibal in 217 B.C., took place in the ancient bay of Tuoro, between the spurs of Borghetto and Passignano on the northern banks of Lake Trasimene, the Romans being caught in their left flank and driven into the lake.

The Pliocene lake deposits, at their highest levels of 320 to 350 m., *i.e.* about 200 m. above the valley floor, form an almost uniform terrace, whose slopes have been cut up by erosion and denudation into countless gullies, which have left the deposits exposed in the grotesque forms of mounds, pyramids, buttresses, and columns. The foundation of these singular structures is always a mound or pedestal of clay, on which is built a column of argillaceous sand, surmounted by a crown of sand, gravel, or conglomerate. These Pliocene ruins are strikingly in evidence on both sides of the Arno, more especially midway of the basin between Montevarchi, S. Giovanni, and Figline. Borings down to the Eocene rock bed have shown that the ancient lake must have attained a maximum depth of at least 270 m.

The classic tropical fossil flora and fauna of the S. Giovanni basin mark the end of the Pliocene and a transition to the Pleistocene period. The imprints of the flora are mainly derived from plants, leaves, and other organic material accumulated in sheltered inlets; the famous fossil remains of the fauna comprise an abundant variety of *big* species of tropical and subtropical mammals and reptiles, of fishes, birds, and lacustrine shells embedded in the argillaceous Pliocene deposits on both sides of the Arno.[1]

The lignite formation occurs more especially midway of the basin in the clay beds of the slopes on the left side of the valley. It is composed of two kinds: one, a peaty lignite, the result of organic material accumulated and compressed in pools and inlets, as already mentioned; and the other, a true xyloid lignite which constitutes the bulk of the formation, and forms the three more or less contiguous but independent banks or bays of Castelnuovo, Gavile, and Tegolaia, near S. Giovanni, varying from 15 to 50 m. in thickness. This lignite, embedded in clay, sand, and gravel conglomerate, consists of masses of fossilised coniferous trees up to 5 m. (16 ft.) in diameter, mixed with boulders, rock material, and detritus. The whole remarkable formation is the result of enormous landslips in Pliocene times from the Pratomagno (Vallombrosa)[2] range on the right side of the valley, caused by cloud-bursts or by periods of extraordinary precipitation during which whole tracts of forest were uprooted and swept with all the detritus down into the lake basin and against the hill-slopes on the other side of the valley. A curious phenomenon in connection with the lignite beds is the crust of red earth which runs along the upper surface of the formation, and consists of clay roasted and reddened by the spontaneous combustion of the underlying lignite.

As previously mentioned, the abrupt deflection of the Arno near

[1] The flora and fauna of the S. Giovanni basin have been studied and described by leading Italian and other palæontologists ever since Savi (1833), the father of Tuscan geology. Among the most notable and more recent are Meneghini, Capellini, De Stefani, Pantanelli, Gaudin and Strozzi, Ristori, Forsyth Major, Weithofer, Portis, Regalia, and others.

[2] The famous old Convent of Vallombrosa, now a forestry school, situated at the northern end of the Pratomagno range, at an altitude of 950 m., was founded in 1015 by Gualbarti, a wealthy Florentine, *i.e.* at about the same time as the Hermit Convent of Camaldoli (1012) by St. Romuald. The Vallombrosa Hills have always been proverbial for their dense and shady woods, as the name implies.

Arezzo, its accession to the S. Giovanni basin, and its whole westward flow from that basin to Florence and Pisa are of Quaternary date, and constitute one of the great hydrographic changes of the fluvio-lacustrine period in Central Italy.

Mugello.—About 15 km. below the S. Giovanni basin the Arno is joined at Pontassieve (101 m.) by the river Sieve, which descends from, and has its source in, the interesting and fertile lake basin known as the Mugello. It lies in a trough, 25 km. in length and 7 km. in width, parallel to and between the main chain of the Apennines (here 1200 m.) and the Mte. Morello range (934 m.), which latter separates it from the Florence basin. The river Sieve rises in the Apennines above Barberino (270 m.), and skirts the southern margin of the basin throughout its length to Borgo S. Lorenzo and Vicchio (190 m.), whence it rapidly descends to Dicomano and Pontassieve.[1] The Pliocene deposits, with some lignite bands, are in evidence both on the floor of the valley and on the hill-slopes up to 500 m. altitude, so that the ancient lake must have been 200 to 250 m. in depth. Near the lower end of the basin the Pliocene deposits are cut up by erosion and denudation into mounds, columns, and buttresses very like those of the S. Giovanni basin.

Florence—Pistoia.—About 15 km. west of Pontassieve the Arno enters the great Pliocene and Quaternary lake basin which extends south-east to north-west from Florence (43 m.) to the foot of the Apennines at Pistoia (65 m.), 35 km. in length and 10 km. in width, covering an area of 350 sq. km. (135 sq. miles). It lies in a trough of Pliocene subsidence, between the Mte. Morello range (934 m.) and the Albano Hills (500), which separate it from the ancient marine belt. It presents the peculiar feature that the Arno traverses it, not longitudinally, but transversely, and only at its extreme lower end, from Florence to Signa (40 m.), whence it flows through the Gonfolina defile on its way to the Pisa and the sea. The principal longitudinal river of the basin is the Ombrone, which rises in the Apennines above Pistoia, and, after being joined by the classic Bisenzio[2] and other affluents, drains into the Arno at Signa. The whole drainage of the basin is thus north to south at an inclination of the valley floor of less than 1 in 1000.

The present valley floor is on the surface composed almost entirely of Quaternary and more recent alluvial deposits which are, however, underlain by Pliocene lake deposits, resting on the Eocene formation. Pliocene fossiliferous deposits are, moreover, in evidence in various parts of the marginal hills, *e.g.* below Fiesole, near Florence on the right, in the small outlying basin of Galuzzo on the left of the Arno, up to

[1] The old castle of Pontassieve guarded the southern end of the great military highway from the Arno Valley to Dicomano, and across the Apennines to Forli on the Via Emilia. Hannibal crossed the Apennines in 217 B.C. either by this pass or by Mte. Falferona into the Casentino or upper Arno Valley.

[2] Dante speaks of this picturesque valley as "La Valle onde Bisenzio si dichina" (*Inferno*, xxxii. 56). It extends from Prato to Vernio, where the Bisenzio is joined by the torrent Fiumenta. The latter rises in the beautiful high level basin or *altipiano* of Montepiano (700 m.), girt by the crest-mountains of the Apennines (here 1300 m.). The basin lies exactly on the divide of the Arno and Po watersheds, with an outlet to each, *i.e.* south and north. The Ombrone is a much smaller river than its namesake of the Subapennines.

150 m., and in the larger basins of Ripoli and Grassina in the Ema Valley up to 260 m. altitude. Again, at similar altitudes, they appear on the western margin of the basin near Signa, and near Vignale at the Pistoia end. The depth of the ancient lake must thus have been from 100 to 200 m. Certain isolated deposits in the Greve Valley—and on the heights of the Gonfolina defile, south and west of Florence respectively—point to a connection of the basin with the ancient sea at these points, probably also at its northern end by the low saddle (172 m.) of Serravalle, west of Pistoia.

The Lower Arno.—On emerging from the Gonfolina defile of Signa and Montelupo (30 m.), the Arno traverses in its lower course of 60 km. to Pisa and the Tyrrhenian littoral the great basin which in Pliocene times was entirely occupied by the sea, and, on the retreat of the latter, became an estuary, and then a shallow lake.

Inland the basin is circumscribed on the south by the Subapennine Hills of S. Miniato, Lari, and Leghorn, and on the east and north in a wide curve by the Albano Hills (600 m.), and by the Pescia and Ponte a Moriano Hills at the foot of the Apennines, 10 km. north of Lucca. The ancient sea thus embraced not only the lower Arno Valley proper, but also the trough of Bientina and the Nievole basin [1] between the Arno and the foothills of the Apennines, and, further, the plain of Lucca. In this expanse of the ancient sea covering an aggregate area of 1000 sq. km. (250 sq. miles) only the Permian and Mesozoic *massif* of the Pisa Hills (1000 m.) appeared as an island or promontory.[2]

All round the margin of the basin, *i.e.* in the hills which now bound it on the south, east, and west, as already mentioned, the Pliocene marine deposits attain 100 to 160 m. in altitude, a phenomenon which indicates at once the rise of the land in the Quaternary and the depth of the sea in the preceding Pliocene period. In the basin itself, the superposition of fossiliferous marine, lacustrine, and intermediate estuary deposits of both Pliocene and Quaternary origin is clearly marked, and conclusively shows the gradual transition and evolution of the three stages, which were, in more recent times, succeeded by the purely fluviatile phase, as evidenced by the overlying and still forming alluvia.[3]

Among the specially interesting hydrographic features and changes of the basin are the following:—

(1) The extensive troughs of Bientina and Nievole, between the eastern base of the Pisa Hills, the present Arno and the foothills of the Apennines, which, being even now barely 7 m. and 13 m. above sea level, are obviously the lowest parts of the formerly submerged area.

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[1] The Bientina and Nievole depressions, immediately north of the Arno, cover about 600 sq. km., and are separated from each other by some low Quaternary hills, with Pliocene marine deposits at 160 m. altitude. Both basins are canalised and drain into the Arno. Their lowest points, 7 and 13 m. altitude respectively, are below the level of the Arno (here 14 m. altitude).

[2] The Pisa *massif* was, in Pliocene times, still connected with the low Mesozoic hills of Massarosa, north-west of it, by an Eocene saddle, the present defile of Ripafratta.

[3] For a more detailed description of the Pliocene, Quaternary, and alluvial deposits of the lower Arno Valley, see "The Pisa Hills," *Italian Mountain Geology*, Part II. p. 112, 1918, by the present writer.

(2) The fact that in prehistoric, perhaps even in early historic, times the Arno flowed along the base of the Subapennine, notably of the Leghorn Hills—*i.e.* considerably more to the south than its present more northerly, though parallel, course through Pisa; and

(3) The phenomenon that the river Serchio, which now flows from Lucca through the Ripafratta defile round the western base of the Pisa Hills, and thence direct into the sea 15 km. north-west of Pisa, was in Quaternary times an affluent of the Arno. As such it flowed from Lucca round the northern and eastern base of the Pisa Hills, through the Bientina depression, and discharged into the old bed of the Arno near Pontedera, 15 km. east of Pisa. This former course is evidenced by deposits of pebbles characteristic of the crystalline rocks and associated formations of the Carrara Mountains or Apuan Alps, which pebbles could only have been transported by the Serchio.

3. The Serchio Basins.

Garfagnana.—The river Serchio rises at the northern end of the Apuan Alps or Carrara Mountains, on the western flanks of Mte. Pisanino (1940 m.), the highest peak of that imposing range. Issuing from the Triassic limestone strata at 1240 m. altitude, 700 m. below the summit, it skirts the northern flanks of that mountain, and then, flowing south, passes through the wild and romantic gorge which bears its name, till it reaches Castelnuovo (277 m.). Wedged between the Apuan Alps on the right and the main chain of the Apennines (1700 m.) on the left, the upper Serchio or Garfagnana Valley lies on the faulted contact line, *i.e.* in a trough of the two mountain ranges as far as Borgo a Mozzano (101 m.), not far from the Baths of Lucca. At this point the Serchio is joined by its principal affluent, the river Lima, which rises in the Apennines near the well-known Abetone Pass (1384 m.). Lower down, at Ponte a Moriano (40 m.), the Serchio enters the plain of Lucca (17 m.), and, after crossing the same, traverses the defile of Ripafratta on its way to the sea, 15 km. north-west of Pisa, as previously stated.

Castelnuovo.—The only ancient lake basins in the Serchio Valley are the two near Castelnuovo and Barga, at about 300 m. altitude, each 5 km. in approximate length and width, and about 6 km. apart from each other. The fossiliferous lacustrine deposits of Pliocene age, with some lignite bands, are in evidence round about and also between the two basins, pointing to their former larger extent and to a probable connection between them.

Lucca.—As previously mentioned, the Pliocene marine deposits of Ponte a Moriano indicate the northern limit of the ancient sea, and it was here that the Serchio expanse communicated with it. In Quaternary times, when the sea had retreated and the plain of Lucca had become a shallow lake, the Serchio flowed through the latter to the south and drained into the Arno east of Pisa as already stated, until the plain of Lucca dried up and its alluvial deposits diverted the river to the west. It was then that the latter eroded its present bed through the low Tertiary depression—now the Ripafratta defile—between Mte.

Maggiore (486 m.) of the Pisa Hills on the left and the low Massarosa Hills on the right.[1]

4. Subapennine Basins.

In the Tuscan Subapennines the ancient sea left in the midst of its own deposits several interesting, though comparatively small, basins which, after its retreat, became lacustrine. Two of these basins lie in the hills north-west of Chiusdino, in the Merse Valley, at about 400 m. altitude, 25 km. south-west of Siena; others in the more immediate vicinity of that town, at about 200 m. altitude. All of them lie in a more or less encircling Pliocene marine area, while they themselves exhibit fossiliferous and lignite-bearing lacustrine deposits, thus attesting the gradual evolution of sea to lake. A third basin is that near and north-west of Massa Marittima in the Maremma Hills, 20 km. from the coast, at 270 m. altitude, whose deposits are also Pliocene lacustrine, showing, like the others, that even after the retreat of the sea, the lacustrine phase must have been of considerable duration. All these basins are about 5 km. in length and 2 to 3 km. in width.

IV.—Conclusion.

The hydrographic and physiographic phenomena in relation to the ancient sea and lake basins described in the foregoing pages and summarised in the Tables of the Appendix, may be shortly stated as follows:—

1. In Central Italy, as throughout the peninsula, the great general uprise of the land in Miocene times was followed by a general subsidence in the Pliocene, and by a new uprise in the Pleistocene or early Quaternary period. The former period was marked by a tropical, the latter or fluvio-lacustrine period by a sub-glacial climate, corresponding to the Glacial Epoch in the Alps.

2. Towards the end of the Pliocene period, the whole of the Tuscan Subapennines was occupied by the sea, which formed a great bay and archipelago 200 km. in length and 60 km. in width, while in the Apennines the great longitudinal troughs of the Tiber, Arno, and lower Serchio Valleys were occupied by vast and continuous lacustrine expanses. The ancient sea and inland expanses intercommunicated at several points, and covered an aggregate area of 17,000 sq. km. or 6600 sq. miles, equal to half the combined area of Tuscany and Umbria.

3. During and in consequence of the new uprise in the early Quaternary period, the sea retreated, the river systems re-formed and became

[1] The picturesque Ripafratta defile describes a complete semicircle round the base of Mte. Maggiore, and is so narrow that there is only just room for the parallel river, road, and railway.

Dante alludes to the keen rivalry between Pisa and Lucca by saying that Mte. Maggiore was interposed between them so that they cannot see each other: "Il monte, per che i Pisan veder Lucca non pono" (*Inferno*, xxxiii. 30).

A remnant of the estuary of the Serchio, not far from its present mouth, is the Lake Massaciuccoli, near Viareggio.

again active, and the continuous lacustrine expanses of the Tiber, Arno, and Serchio Valleys shrank to chains of lake basins. These ancient lakes of the main and tributary valleys numbered no less than twenty-six, and covered an aggregate area of 5000 sq. km., or nearly 2000 sq. miles, equal to 15 per cent. of that of Tuscany and Umbria.

4. In more recent Quaternary and down to historic times, the ancient lakes became, through evaporation and want of drainage, reduced to more or less stagnant marshes, which in some cases endured to a comparatively recent period, and were shunned as malaria-infested waste lands destructive alike to animal and human life. Thanks to the combined processes of natural and artificial sanitation — one by the accumulation of rich fluviatile alluvia on the old marshy soil, the other by systematic draining and reclamation — those ancient basins have been gradually transformed to salubrious regions which are now the most fertile, the best cultivated, and the most beautiful valleys of Central Italy.

The phenomena in Central Italy offer a striking analogy with those which, in the same periods down to the present day, have characterised the great Po Valley in Northern Italy. There, too, the Pliocene Sea occupied the whole of that great subsided basin, covering an area 300 km. in length and 60 km. in width, equal to that of the Tusco-Umbrian Sea and lacustrine expanses. It lasted well into the Quaternary period when it was still in contact with the Alpine glaciers, until the new uprise of the land forced it to retreat. The great lacustrine expanses which it left behind gradually shrank to marshes, and these, enriched by Alpine fluviatile alluvia and reclaimed by drainage, became, in time, like the valleys of Tuscany and Umbria, a vast region of exuberant fertility.[1]

The depth of the Central Italian basins, ranging from 100 to 400 m. as shown by the Pliocene deposits, strikingly corresponds with that of the present principal lakes north and south of the Alps, which lie in similar zonal troughs. Thus, the seven principal Swiss lakes from Lake Constance to Lake Geneva range in greatest depth from 252 to 143 and 334 m.; the seven Italian lakes from Lake Orta to Lake Garda from 300 to 400 and 346 m.[2]

Note.—The hydrographic map (Fig. 1) is, of course, on too small a scale to admit of all the names of mountains, rivers, and places being inserted. Apart from the Italian Ordnance maps 1 : 100,000, 1 : 75,000, and the contour map 1 : 25,000, the best general map of Tuscany is B. Lotti's Geological Survey Map 1 : 50,000, attached to his standard work *La Geologia della Toscana*, Rome, 1910. The results of his equally outstanding survey of Umbria were published in the *Bollettino R. Comitato Geologico d'Italia*, 1899 to 1906. Among other recent publications on parts of S. Tuscany and Umbria are those by A. Verri, 1880-

[1] *Vide* the present writer's "The Moraine Walls and Lake Basins of Northern Italy," *Italian Mountain Geology*, Part I., 1918.

[2] "Zonal Lake Basins in Subalpine Switzerland," *Geolog. Magazine*, May 1915, p. 220.

1887; P. Moderni, 1900; and on the lignite deposits, by V. Simonelli, 1916, and B. Lotti, 1917 and 1918.

The Tuscan Subapennines, Elba, and the Apuan Alps have been described by the present writer in *Italian Mountain Geology*, Parts I. and II., London, Dulau and Co., 1918.

The beautiful and historic country from Arezzo to Perugia, Foligno, Spoleto, Terni, Narni, and thence through the lower Tiber Valley to Rome, has been finely illustrated by Sir Frederick Treves in the numerous photographic plates of his work, *The Country of the Ring and the Book*, London, Cassell and Co., 1913.

APPENDIX.

The Ancient Lake Basins of Central Italy.[1]

Basin.	Area sq. km.	Altitude. m.	River.
TABLE I.			
A. Tiber Basins.			
1. Città di Castello	200	286	Tiber
2. Umbertide	200	243	,,
3. Perugia	100	210	,,
4. Foligno	500	210	Topino-Chiaggio
5. Todi	400	174	Tiber
Tributary Basins.			
6. Gubbio	100	475	Chiaggio
7. Terni-Narni	100	100	Nera
8. Rieti and Piediluco	200	400	Velino
9. Leonessa	25	970	trib. of Nera
10. Norcia	25	600	trib. of Nera
	1850		
B. Arno Basins.			
1. Casentino	60	375	Arno
2. Arezzo	50	210	,,
3. Chiana, tributary	900	210	Chiana
4. Trasimene ,,	150	259	trib. of Chiana
5. S. Giovanni	450	120	Arno
6. Mugello, tributary	150	190	Sieve
7. Ripoli, ,,	40	50	Ema
8. Florence-Pistoia	350	40	Arno
9. Pisa, Bientina, and Nievole	800	4, 7, 13	Arno and Nievole
	2950		
C. Serchio Basins.			
1. Castelnuovo	25	300	Serchio
2. Barga	25	300	,,
3. Lucca	200	19	,,
	250		

Basin.	Area. sq. km.	Altitude. m.	River.
Table I.—Continued.			
D. Subapennine Basins.			
1.2. Chiusdino	30	400	Merse.
3. Siena	15	200	—
4. Massa Marittima	15	270	—
	60		
E. Totals.			
10 Tiber Basins	1850		
9 Arno ,,	2950		
3 Serchio ,,	250		
4 Subapennine	60		
26	5110	sq. km.	=1960 sq. miles.
TABLE II.			
Area of Tuscany	24,104		
,, Umbria	9,700		
	33,804	sq. km.	=13,000 sq. mls.
Area of Ancient Sea and Lacustrine Expanses	17,000	sq. km.	=6,600 sq. mls. =50·8 per cent
Area of Ancient Lake Basins	5,110	sq. km.	=1960 sq. mls. =15 per cent.
TABLE III.			
Length of River Tiber	400 km.	=	250 miles.[2]
,, ,, Arno	220 ,,	=	140 ,,
,, ,, Serchio	120 ,,	=	75 ,,
,, ,, Ombrone	170 ,,	=	106 ,, [3]

[1] The areas of the lake basins are, of course, only approximate, being the products of the mean lengths and widths of their present floors. At the actual former levels of the lakes, 200 to 400 m. above the floors, the areas would be correspondingly larger. The altitudes are those of the exits of the basins.

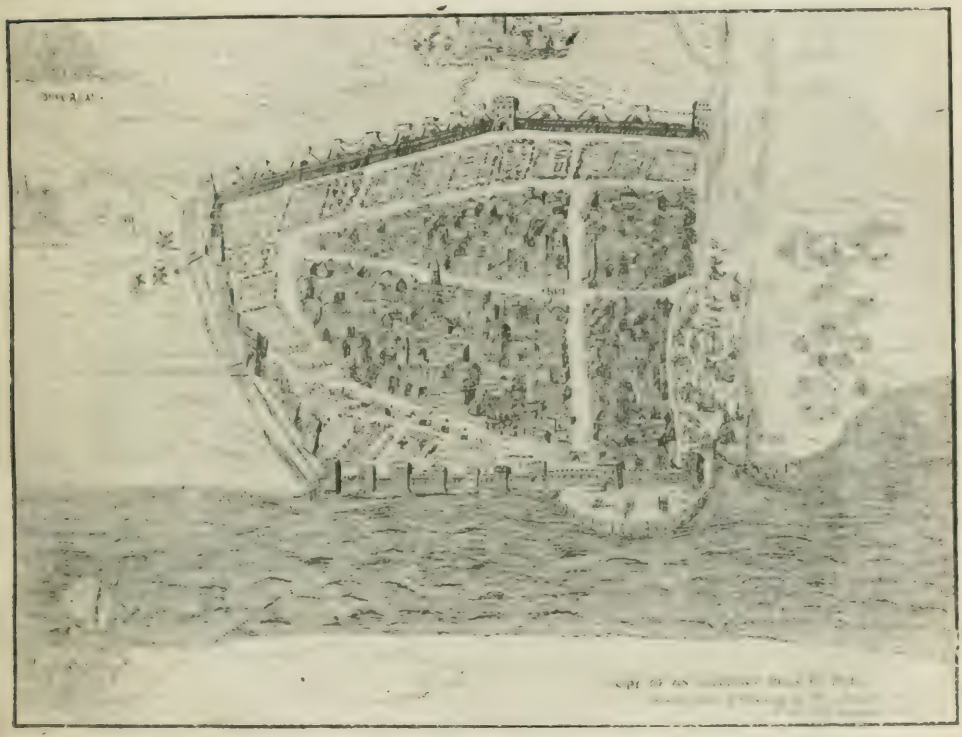
[2] The length of the Tiber in Umbria is 240 km., on Roman territory 160 km.

[3] This is the Ombrone of the Subapennines, as distinguished from the much shorter Ombrone of the Florence and Pistoia basin.

GEOGRAPHICAL NOTES.

EUROPE.

Ancient Hull (*with Plan*).—The accompanying figure is a reproduction of the plan of fourteenth-century Hull, to which reference was made on p. 163 of Captain Rodwell Jones's article in the last issue. The block, which has been kindly lent by Mr. T. Sheppard, Curator of the Municipal Museums at Hull, did not arrive in time to be included



Fourteenth-century Plan of Hull.—(*From "The Evolution of Kingston-upon-Hull."*)

in the article. It shows the entrance of the river Hull into the Humber, the harbour, guarded by a chain hung just at the entrance, also the old walls, the wharves, the moat, and the gardens enclosed within the city walls.

An Early Scots Colony in the Caucasus.—In connection with the note on this subject, which appears in our last issue (p. 193), Mr. Harold Raeburn sends us the following: "In regard to the quotation describing the inception and character of this early Scottish missionary effort, it may be said that the settlement was never in any sense a Scottish 'colony,' nor was it a settlement in the 'mountains' of the

Caucasus. The site of the mission station was placed among the 'Five Hills' of Piatigorsk ('Five-hill-town'), which shoot abruptly above the vast rolling prairies of Cis-Caucasia, a day's journey north of the foothills of the Caucasus. The mission only existed till 1835, when it was suppressed by the fickle ruling powers of Russia.

"An interesting account of a visit to the 'colony' is given in Sir D. Mackenzie Wallace's great work. When travelling, about 1870, through Stavropol, a prairie town eighty miles north of Piatigorsk, he observed on his map 'Skollandskaya Kolonia,' and proceeded to visit the place. He found the village, but the inhabitants were mostly Germans, and spoke that language. Wallace was about to go away disappointed when the schoolmaster referred him to an old 'Circassian' who knew the antiquities of the place. This old man was, it appeared, a survivor of one of the few converts of the original mission, and had been purchased when a baby. His real name of Teonna had been suppressed, and he was baptized in the name of the well-known Edinburgh doctor, John Abercrombie, who had subscribed liberally to the mission. The missionaries had expected to convert heathens, but found that the only people they could reach were already converts to Mohammedanism. The only possible method of conversion was to buy children as slaves, and bring them up as Christians.

"Custom, and probably necessity, had made the export of their children a little-blamed feature of Circassian economics. If some, especially of the girls, had not been sold famine would have been endemic in the narrow upland valleys. Wallace found only one genuine villager of Scottish descent, the son of a missionary named Galloway. The others were German immigrants or natives.

"The latest Russian statistics, not of course quite reliable, show generally an extraordinary predominance of males in the population of the Caucasian Mountains. This is undoubtedly not natural, and points to the survival of a practice very general in overcrowded Eastern countries. Probably it was less prevalent when the slave trade was customary. The only remedy seems to be emigration, but the mountaineers are intensely attached to their homes."

Australasia.

The Islands of the Western Pacific.—In the *Journal* of the Royal Society of Arts for 6th December last, there appears an article by Sir Everard im Thurn, based upon a paper read by the author before that society, and followed by a report of the subsequent discussion. The paper bears the title of "The Present State of the Pacific Islands," but its contents are devoted chiefly to that great group of islands which cluster thickly round the eastern shore of Australia, and extend thence along the Equator, tapering to a point towards the American shore. These form, as it were, a series of stepping-stones from shore to shore, used in the migrations of primitive folk, and still of importance as halting places in the trans-oceanic journey.

Sir Everard points out, in the first place, that the map affords little

guide either as to the real size of the islands, or as to their value. The first fact is due to the atoll formation of many of the groups, which means that a considerable part of the apparent area is occupied by the lagoon, and this, unless it contains pearl shell, is valueless, while at the same time the surrounding rim of rock may be almost bare of soil, and afford scarcely any foothold to land plants. Despite their small size, however, many of the islands are of importance either for economic or strategic reasons. Thus Ocean and Pleasant Islands consist of practically solid masses of phosphatic rock, and Fanning Island, which is not only small in total area, but has much of its surface occupied by the lagoon, is of great importance as a cable station. Again, Pago-Pago in American Samoa has a very fine harbour.

As to the chief natural products of the islands, the coco-nut palm is the most important indigenous plant, both from the point of view of the natives and from that of Europeans. In earlier days, however, sandalwood formed a valuable article of trade. In the early part of the nineteenth century, a fairly extensive trade was carried on between Port Jackson and the Fiji Islands, ships coming from the former in search both of the sandalwood, which was cut down by the natives, and of pork. By 1913 most of the accessible trees in Fiji had been cut down, and the trade in sandalwood was transferred to the Marquesas Islands, and still later to the New Hebrides, where it lingers in a desultory fashion. In Fiji the pork and sandalwood period was followed by a trade in *bêche-de-mer* for the Chinese market, and later it was shown that, for a time at least, cotton could be grown in the islands with success.

In the later part of the nineteenth century interest in the Pacific Islands on the part of the Great Powers was stimulated rather by questions of strategy than of trade, and Germany's efforts to establish herself there, according to the author, had definitely this basis. She made little attempt to extend the cultivation of tropical products even in German New Guinea and the adjacent islands, where large tracts of land are available for the purpose.

In regard to the future, Sir Everard im Thurn gave it as his opinion that the partition of the Pacific Islands as it existed in 1914 was equitable, save in so far that it gave Germany more than she deserved. He considers that there can be now no question of returning any of her possessions to that Power, and proposed the following distribution of the former German territories. Kaiser-Wilhelm Land and the Bismarck Archipelago, with a change of name, to go to Australia; German Samoa to be united to New Zealand; while a strong Crown Colony should be formed out of the Fiji and Tongan groups, with the New Hebrides and all the Solomon Islands, and the Gilbert and Ellice Islands, definitely including with the latter the two phosphate islands of Nauru and Oceanic Island. The remaining small islands away to the north should, he stated, be left to Japan.

Polar.

New Antarctic Expedition.—Plans are being prepared for another Antarctic expedition, which will sail in the *Terra Nova*, and be assisted by the latest improvements in aviation and wireless telegraphy. The plans of the expedition are already in an advanced stage. It will be known as the "British Imperial Antarctic Expedition," its leader being Mr. John L. Cope. Mr. Cope accompanied the Imperial Trans-Antarctic Expedition, 1914-17, as surgeon and biologist to the Ross Sea party, and was one of the party of nine who were left on the Great Ice Barrier to lay depots after the *Aurora* had broken away from her moorings. Since returning to this country Mr. Cope has served in the R.N.V.R. as a lieutenant, but he has never abandoned the idea of organising a further venture at the earliest possible date.

The expedition expects to leave this country in June 1920, and Mr. Cope states that the expedition will return to this country in 1926. During the six years continuous communication is to be maintained with the centres of civilisation by means of a wireless equipment.

The main objects of the expedition will be:—1. To ascertain the position and extent of the mineralogical and other deposits of economic value known to exist in Antarctica, and arrange for their practical development as a further source of imperial wealth. 2. To obtain further evidence of the distribution and migration of the whales of economic value, and to create a British industry. 3. To investigate the meteorological and magnetic conditions of the Ross Sea area and at Cape Ann (Enderby Land) in connection with their influence on similar conditions in Australasia and South Africa respectively. Such results have been proved of great value by the stations established by the Argentine Government in the South Orkneys and that established on Macquarie Island by the Commonwealth of Australia, which has been given up owing to the war. 4. Generally to extend knowledge of Antarctica, especially with a view to obtaining further scientific data of economic importance.

Mr. Cope states that arrangements are being made to take an aeroplane to assist in surveying the interior of the continent. With this machine even a flight to the South Pole is contemplated. The plans include a base at New Harbour, in Victoria Land, and a wintering party in the middle of the Ross Barrier, while attempts are also to be made to map the coast-line between Enderby Land and Coats Land, and even to follow the coast of Antarctica from Graham Land to King Edward VII. Land.

Economic Geography.

The Kara Sea Route to Siberia.—In connection with the article by General Schokalsky which we published in the April issue (p. 130), it is interesting to note that the new wireless stations which are being constructed on the coast of Siberia are, in combination with aeroplanes, to be utilised to facilitate communication with the interior by means of

the rivers entering the Kara Sea. It will be remembered that the Trans-Siberian Railway between the Urals and Lake Baikal crosses no less than six of the great Siberian rivers, thus rendering possible connection between the coast and the railway by means of steamer and barge traffic. At the present time the condition of the Siberian Railway is very bad, and the need for supplementing it as a line of communication great, both for military and economic purposes. The great difficulty about the Kara Sea route is, of course, that while the rivers are open to communication for five or six months every year, coastal communication is only possible for some eight to twelve weeks in the middle of summer, and even then the ice hampers navigation seriously. The intention is therefore to use aeroplanes and wireless stations to keep the navigators of the vessels informed of the free channels. Further, it is proposed eventually to establish a great depot on the western coast of Novaya Zemlya, which will be the head of navigation for the ocean-going steamers. From this point barges will be towed to the mouths of the rivers. The present plan involves the preparation of a fleet of suitable vessels, towing barges, which is to leave England in July. These vessels are to be met at the mouth of the rivers by river steamers. Siberia is at present in great need of foreign supplies, especially manufactured goods, and is able to furnish a large amount of Siberian produce in exchange.

EDUCATIONAL.

A Summer School in Geography will be held at the University College of Wales, Aberystwyth, July 29th to August 15th, 1919. There will be a continuous course of lectures by Professor Fleure on Eurasia; lectures on Climate and on the teaching of Geography by Mr J. Fairgrieve, and on certain parts of Africa by Mr. W. H. Barker.

A special feature of the course will be a series of demonstrations and discussions, dealing with difficulties in teaching in secondary and in elementary schools, under the special charge of Mr. E. S. Price and Mr. W. H. Barker.

Excursions and Museum Visits will form a part of the course, and an exhibition of books and other matters of importance to teachers of geography will be on view under the charge of Miss R. M. Fleming, who will be glad to give help and advice.

Members of the Geography School will be able to attend a course of lectures by Professor Chapple on Educational Problems, more especially of the new Continuation Schools. There will also be History Courses available as alternatives to the various parts of the Geography Course. The fee is £2, and should be sent to the Registrar, University College of Wales, Aberystwyth, who will answer further inquiries. Early applicants may secure board residence at the Alexandra Hall, Aberystwyth, and should write to the Warden there. Professor Sir Henry Jones will give evening public lectures on Citizenship.

NEW BOOKS.

EUROPE.

Greece before the Conference. By POLYBIUS. With a Preface by T. P. O'Connor, M.P., and an Ethnological Map. London: Methuen and Co., 1919. *Price* 5*s. net.*

As the title indicates, this little book is a presentation of the Greek case, written with a view to the Peace Conference. There is a coloured ethnological map, and an appendix containing those detailed population statistics, which are so apt to arouse scepticism in these areas of constant wars, migrations, and massacres, and doubtful or non-existent census records. In his preface Mr. T. P. O'Connor claims for Greece the Dodecanesian Islands, Thrace, Northern Epirus, and, though with some hesitation, Constantinople, as well as the western littoral of Asia Minor. The claims made in the body of the book are somewhat less extreme—Constantinople, for instance, with a belt of land around it, is to form a Byzantine Republic—but even so, are sufficiently extensive to show that if a new era of peace, tolerance, and sweet reasonableness is about to dawn on the earth, it will not be in the Near East that it will make its first appearance.

The New Eastern Europe. By RALPH BUTLER. London: Longmans, Green and Co., 1919. *Price* 10*s.* 6*d. net.*

The author of this collection of essays employs the term "Eastern Europe" to include the new border States which have arisen between Russia and Central Europe. His book therefore contains articles on Finland, the Baltic Provinces, Lithuania, Poland, and the Ukraine. With the apparent exception of that on the Baltic Provinces, the articles have already appeared in various of the *Reviews*, and are reprinted without modification, except for the addition of certain footnotes. Three chapters are devoted to Poland, these having been written respectively just before the Russian Revolution, immediately after the Brest negotiations, and just after the Armistice last November. The dates of the other articles are not stated. The author states that he decided, after due consideration, to leave the Polish articles as they were originally written, in the belief that the record of the development of the Polish question which they give would be of some value in studying this difficult problem.

Such a book has certain obvious disadvantages. Some at least of the essays display very markedly the characteristics which one expects to find in the "higher" political journalism. We have the inevitable Latin "tags," once supposed to be an indispensable ornament of parliamentary speeches; the desire to score off political opponents in this country also finds expression, sometimes in forms which, read at leisure when presented in permanent form in a book, do not appear to be in the best of taste, and seem out of place in serious discussions of profoundly difficult problems.

If, however, the reader can discount such disadvantages, inevitable in a republication of essays written originally to meet particular political situations, he will find much useful information. Mr. Butler appears to have obtained freer access to recent German publications than has been granted to most persons in this country during the war, and has evidently a large amount of detailed information in regard to the social and political conditions, both before the war and during its course, which prevail in a part of Europe which has hitherto been little known or studied in this country. The articles on Finland, the Baltic Provinces, and

Lithuania seem to us especially useful, for information is somewhat easier to obtain in regard both to Poland and to the Ukraine. There is a good and detailed index.

ASIA.

Syria: The Desert and the Sown. By GERTRUDE LOWTHIAN BELL. With many Illustrations and a Map. New and cheaper edition. London: William Heinemann, 1919. *Price 7s. 6d. net.*

We reviewed the first edition of this book in vol. xxiii., p. 324. The present re-issue is due to the new demand for the book, which has resulted from the occupation of Palestine by the allied armies, and the fact that Miss Lowthian Bell wrote long before the war gives her work a detachment from present-day problems, which is singularly attractive in a war-weary world. The illustrations are unfortunately much less effective than on the better paper of the first edition.

A Burmese Loneliness: A Tale of Travel in Burma, the Southern Shan States, and Keng Tung. By Capt. C. M. ENRIQUEZ, F.R.G.S., 21st Punjabis. Calcutta: Thacker, Spink and Co., 1918.

During the war period Captain Enriquez was in command of the military post of Loumwe, an outpost in Keng Tung, the largest and most remote of the Southern Shan States. Keng Tung is the most easterly part of Burma, and is bounded on three sides by foreign territory—the Chinese province of Yunnan on the north, French Indo-China on the east, and Siam on the south, for it juts out eastwards in a great salient. Communications even with Burma proper are difficult; much more so those with the great world beyond. Here, therefore, during the years of fighting, the author was constrained to pass lonely hours, and his book at once describes his loneliness and sets forth the interests which he carefully cultivated in the attempt to still his longing for greater activity. It is a charming book, full of detailed observations on the folk-lore, customs, manners, and so forth of the varied peoples of these frontier States, as well as on their plants and animals, and of reflections upon a multitude of topics, especially on the ideals of the Burmese as contrasted with our own.

Captain Enriquez has apparently no great sympathy with the natives of India, whether represented by babus or by native moneylenders, but both for the peoples of Burma and for the Chinese of Yunnan he has much admiration. It is difficult not to quote from his pages. We note that well-to-do Chinese merchants entering Burma with their caravans of goods borne on mules carry—in addition to magazine rifles and neat bandoliers—thermos flasks! Of what he describes as the "evasive courtliness" of the Chinese, the author gives also some amusing examples. Thus a Chinese "governor," who had risen to power with some rapidity in a district just across the frontier, was requested to deliver up two dacoits who had taken refuge in a considerable garrison town within his territory, the town being called Murng Se. "But firm in the knowledge that neither Rangoon nor the Foreign Office had ever heard of Murng Se in their lives, Kaw Shee Shin replied that, though his heart was lacerated about the dacoits, he had been unable to find any place in China called Murng Se."

A very interesting account is given of the rain-making ceremonies of the Burmese New Year, which comes in April, at the beginning of the first rains. At this time the "King who Knows and Hears" descends from his throne in heaven to succour the parched earth, and remains for a lunar month, only leaving for his celestial abode when the dust of the drought has been washed away, and the grass-blades

are springing up through the moistened soil. At the New Year festival, water was formerly sprinkled, nominally to prepare the earth for the coming of the great king, the process being really a "rain-making" rite of the usual type. But the religious significance of the ceremony is fading, especially among the younger members of the community, who find great enjoyment in squirting water, not *over* the ground, but *at* their elders, dressed in their best for the state ceremony of obeisance at the palace. They use, it would appear, pumps and hose for this malicious purpose. Doubtless before long even the tradition of the religious and magical object will disappear, and the rite will degenerate into pure carnival. Captain Enriquez's sympathy with primitive folk enables him to tell these and other tales with a delicate vein of humour which is very attractive. We recommend the book to the notice of our readers.

AMERICA.

Peru-Bolivia Boundary Commission, 1911-13. *Reports of the British Officers of the Peruvian Commission.* Edited for the Government of Peru by the Royal Geographical Society of London. Cambridge University Press, 1918.

Owing to the outbreak of war the British officers of the Peruvian Commission, then engaged in London upon the preparation of their reports, were recalled to their regiments, and within a brief period two of them had fallen in battle, so at the request of the Peruvian Government, and with the assent of the Bolivian authorities, the task of completing the Reports was undertaken by the Royal Geographical Society. This work was carried out by Col. Sir Thomas H. Holdich, with the assistance of Mr. A. R. Hinks, F.R.S. Owing to the advanced state of the report, only slight changes were required in the material collected by Colonel Woodroffe "and his most able assistant" the late Major Toppin.

The Boundary Commission work of delimitation lay between the latitudes of 11° and 15° S., longitudes 68° and 69° 30′ W., and is succinctly summarised by Colonel Sir Thomas Holdich in the introductory chapter. The technical difficulties in laying down a line of demarcation between the two countries were greatly increased by the complexity and density of the rubber forests, where a track had to be laboriously cut through for many miles, and to the swamps which had to be negotiated. Insect pests rendered life almost unsupportable. "Sand flies on the rivers are replaced by ants and wasps, stinging, blood-sucking, extracting the salt from the perspiring body of the wretched traveller." Innumerable ants in solid columns ate the food of the party and reduced their clothes to rags in the course of an afternoon. Stingless bees crawled up noses, into eyes and ears, and when killed exuded an unpleasant sickly odour.

The principal obstacle to the work of triangulation was the weather, an eternal shroud of dense mist hanging over the forests at about 11,000 feet. The foothills and the mountains were sometimes cut off from each other for weeks on end by this thick blanket of mist, which precluded observations, although an hour's ascent or descent "will probably bring you into sunshine." The Commission on one or two occasions devoted their enforced leisure to gold-seeking in the "Sierra," but as they were working in a "gold-field of the past" the results were not very remunerative. In most mountain streams an afternoon's "washing" with a hand basin will result in ten shillings' worth of gold. Toppin while at Poto devoted a Sunday to gold washing without result, getting half frozen for his pains, while the cook, searching for nuggets under a cliff, got nothing but a broken head. An atmosphere of romance surrounded the discovery of flakes of gold deposited on photographic

plates developed in the headwaters of some unknown stream far below the "Cordillera," but in spite of anxious search, the source of the gold remained a mystery.

The work is clearly printed and contains a large number of excellent illustrations, maps, and panoramic views. Although of an official nature it contains much that is entertaining and instructive, and gives a very clear picture of the vicissitudes of this most interesting expedition. Major Toppin was a keen naturalist and entomologist, and turned to good account his three seasons in the field. His collection contained three new species of butterfly, a new species of Hymenoptera, and a new species of monkey, which, in spite of climatic difficulties, was brought home for the National Museum, along with several other mammals from an almost unknown part of South America.

GENERAL.

The Destinies of the Stars. By Svante Arrhenius, Ph.D., President, Nobel Institute, Stockholm, Sweden (Recipient of the Nobel Prize in Chemistry, 1903). Translated from the Swedish by J. E. Fries, Fellow A.I.E.E. G. P. Putnam's Sons, New York and London, 1918. *Price* 7*s.* 6*d.*

This book consists of a collection of cosmogenic articles dealing with questions which have largely arisen from new discoveries and observations within the scope of astronomy by the famous Swedish scientist, Dr. Arrhenius, of Stockholm. Though some of the articles appeal primarily to the student of astronomy, nevertheless the student of geography and the general reader cannot fail to be interested in reading of the newest developments in the study of planetary evolution, and the latest attempts of scientists to read "the riddle of the universe." Perhaps the most interesting chapters to the geographer are those dealing with the climatic importance of water vapour and with the physics and chemistry of the atmosphere. The author is strongly of opinion that no appreciable climatic modifications have taken place within historic time, and contests the theory held by Huntington and others of a slow deterioration of climate in historic time, due to increasing desiccation. He traces the development of life on our planet, and disposes of the formerly popular ideas about the probability of life in the planet Mars. Other interesting chapters deal with such subjects as the riddle of the Milky Way, and the stage of development reached by the Moon and by the planets Mercury and Venus. He also foreshadows a period when our own earth shall cease to provide conditions for organic existence and will become a dead planet. The whole book is of absorbing interest, and the author's lucid style and polished form has lost nothing in the well-rendered translation of Mr. Fries. The book is beautifully illustrated with plates and maps.

BOOKS RECEIVED.

The Problem of the Pacific. By C. Brunsdon Fletcher. Preface by the Rt. Hon. Sir Wm. Macgregor, P.C., G.C.M.G., C.B. With a map. Demy 8vo. Pp. xxix + 239. London: Wm. Heinemann, 1919. *Price* 12*s. net.*

Shore Processes and Shoreline Development. By Douglas Wilson Johnson. 1st Edition. Royal small 8vo. Pp. xvii + 584. London: Chapman and Hall, 1919. *Price* 23*s. net.*

Technic of Surveying Instruments and Methods. By WALTER LORING WEBB, C.E., and JOHN C. FISH, C.E. 1st Edition. Foolscap 8vo. Pp. xvi + 319. London: Chapman and Hall, Ltd., 1917. *Price 9s. 6d. net.*

Études de Cartographie Historique sur l'Allemanie. (Régions du haut Rhin et du haut Danube du iii^e^ au viii^e^ Siècle.) Par J. M. TOURNEUR-AUMONT. Royal 8vo. Pp. 322. Paris: Librairie Armand Colin, 1918. *Price 12 fr.*

A Handbook for Travellers in India, Burma, and Ceylon. 10th Edition. With 79 maps and plans. Crown 8vo. Pp. clxxv + 726. London: John Murray, 1919. *Price 24s. net.*

The Use of the Terrestrial Globe: A Practical Little Book of Explanatory Notes, Diagrams, Problems, and Tables. Royal small 8vo. Pp. i + 37. London: George Philip and Son, Ltd., 1919. *Price 2s. net.*

Palestine Exploration Fund. Quarterly Statement, from Vol. I. 1869 to 1918. 51 volumes. Bound in cloth. London: Published at the Fund's Office.

Thirty Years' Work in the Holy Land (A Record and a Summary), 1865-1895. Crown 8vo. Pp. 256. London: Published for the Committee of the Palestine Exploration Fund, 1895.

Palestine Exploration Fund. Fifty Years' Work in the Holy Land: A Record and a Summary, 1865-1915. By Col. Sir C. M. WATSON, K.C.M.G., C.B., M.A. Crown 8vo. Pp. 190. London, 1919.

Dictionary of Greek and Roman Geography. Edited by WILLIAM SMITH, LL.D. In two volumes. Medium 8vo. London, 1856.

Handbook of the Old Northern Runic Monuments of Scandinavia and England. By Dr. GEORGE STEPHENS, F.S.A. Crown folio. Pp. xxiv + 281. London: Williams and Norgate, 1884.

Travels in Georgia, Persia, Armenia, Ancient Babylonia during the Years 1817, 1818, 1819, *and* 1820. By Sir ROBERT KER PORTER. With numerous engravings of portraits, costumes, etc. In two volumes. London, 1822.

Historical Geography of the British Colonies. Vol. I.: The Mediterranean and Eastern Colonies. By R. E. STUBBS. Vol. IV.: South and East Africa. By C. P. LUCAS, B.A. Crown 8vo. Oxford: Clarendon Press.

Presented by General Sir Charles Warren, G.C.M.G., K.C.B.

The Pioneers of the Alps. By C. D. CUNNINGHAM and Captain W. DE W. ABNEY, R.E., F.R.S. Demy folio. Pp. 287. London, 1887.

Mountain, Loch, and Glen: Illustrating "Our Life in the Highlands." From Paintings executed expressly for this work. By JOSEPH ADAM. With an Essay on the Characteristics of Scottish Scenery, by the Rev. NORMAN MACLEOD, D.D. London: Bell and Daldy, 1869.

Presented by Captain John Bartholomew.

Geographisch-physikalische und Naturhistorische Beschreibung des Russischen Reichs. Von Dr. JOHANN G. GEORGI. 2 vols. Konigsberg, 1802.

The Illustrated Atlas of Scripture Geography. By W. HUGHES, F.R.G.S. London, 1840.

Atlas Classica: Being a Collection of Maps of the Countries mentioned in the Ancient Authors, both Sacred and Profane. London, 1808.

First Complete Map of the Cities of New York, Brooklyn, and Williamsburgh. New York, 1853.

Presented by Prof. James Ritchie, Edinburgh.

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

NOTES ON THE HISTORICAL GEOGRAPHY OF THE DARDANELLES.

By W. R. Kermack.

(With Map and Illustrations.)

By the time these lines appear in print it is likely that the fate of the Turkish Empire and the guardianship of the Dardanelles and Constantinople will have been settled, that the wheel of history will have come full circle, Western influence again be paramount in the city of Constantine, and "the Sick Man of Europe" will probably be—dead. But as, while our hopes may be what they will, no man can yet confidently affirm that the tide of Eastern aggression on the West has for ever ebbed, or that Russian ambition has for ever renounced its imperial dreams, it may still be worth while to look for a minute at some of the geographical conditions which have helped to decide in the past, and may so decide again, the mastery of those straits, which he who holds, holds at once the gate of the Black Sea and the bridge from Asia to Europe.

1. The Gate of the Black Sea.

The Rhodope Mountains of the Balkan Peninsula and the land mass of Asia Minor are both formed of ancient types of rock, and were indeed at one time in geological history continuous. The great earth disturbances which heaved up the folded mountain chains of the Alps, Carpathians, Balkan Mountains, and Dinaric Alps broke off and forced downwards the southern part of this older continental mass below what is now the Ægean Sea: and thus Europe was separated from Asia. Fault lines, outbursts of volcanic rocks, such as the peaks of Imbros which, viewed from Cape Helles, stand out so like the hills of Arran at

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40
BLACK SEA
EUROPEAN TURKEY
ASIATIC TURKEY
ADRIANOPLE
CONSTANTINOPLE
Bosporus or Str. of Constantinople
SEA OF MARMARA
Dardanelles
Gulf of Saloniki
ÆGEAN SEA
ARCHIPELAGO
Mitylene (Midilli)
Brusa
Adranos
Bigaditch
Balat
Soma
Bergama
Alexandria Troas
Gallipoli
Rodosto
Panderma
Mudania
Artaki
Scutari
Kilia (Shile)
Sabandja
Yalowa
Ismid
Kirmasti
Taushanli
Kutaya
Simaw
Philippopolis
Salonika
Mt. Athos
Thasos
Samothraki
Lemnos
Imbros I.
Tenedos I.
Marmora I.
Prinkipo
Halki
Sivri Ada
Enos
Dedeagatch
Volgaro
Panagia
Khora
Kastron
Sarkoi
Nagara
Achi Baba
C. Helles
Sigri
Kalonè
Molyvos
Adrasti
Aivali
Muselim Chan
G. of Adramyti
Besika B.
Rum Kalesi (Ilium)
Troad
Ida
Balikesri
Eskisher
Sugud
Ismik L.
Apollonia
Lake Bolbe
Lake Koronia
Lake Langaza
Lake Volvi
Mt. Olympus
Mt. Ossa
Mt. Pelion
Mt. Pangæus
Mt. Rhodope
Mt. Ida
Mt. Kortsimo
Mt. Kurtsimo
Mt. Phillio
Mt. Xiroluri
Mt. Skantzura
Mt. Skopelos
Mt. Rhodhrona
Mt. Psathura
Mt. Athos
Gulf of Volo
Gulf of Katerina
Gulf of Kassandra
Gulf of Rendina
Gulf of Orfano
Gulf of Xeros
Gulf of Saros
Gulf of Hagion Oros
Gulf of Monte Santo
Strait of Lemnos
Strait of Tenedos
Strait of Mitylene
Strait of Skopelos
Strait of Zea
Strait of Kea
Strait of Andros
Strait of Tino
Strait of Skyros
Strait of Skiathos
Strait of Ajistrati
Strait of Kassandra
Strait of Thasos
Strait of Orfano
Strait of Rendina
Strait of Volo
Strait of Katerina
Strait of Potidea
Strait of Salonika
Strait of Monte Santo
Strait of Hagion Oros
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Strait of Saros
Strait of Gallipoli
Strait of Dardanelles
Strait of Marmora
Strait of Bosporus
Strait of Constantinople
Strait of Kilia
Strait of Shile
Strait of Kerpe
Strait of Sungurlu
Strait of Ada
Strait of Sabandja
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Strait of Molyvos
Strait of Adrasti
Strait of Aivali
Strait of Muselim Chan
Strait of G. of Adramyti
Strait of Besika B.
Strait of Rum Kalesi (Ilium)
Strait of Troad
Strait of Ida
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Strait of Eskisher
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Strait of Mt. Rhodhrona
Strait of Mt. Psathura
Strait of Mt. Athos
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home, sharp against the golden background of the setting sun, hot springs like those of Therma on Lemnos (itself sacred in Greek legend to Hephæstus), worth a longer walk even than that from the British camps at Mudros in 1915 for the almost incredible luxury of a hot bath, —all are signs and legacies of this great disturbance.

At the north-east corner of the Ægean Sea so formed lies a group of islands and peninsulas, of which the chief is the large island of Lemnos, midway and a little south of a line joining the southern extremity of the peninsula of Mt. Athos in Chalcidice to the southern extremity of the peninsula of Gallipoli, Cape Helles. Lemnos, with an area of about 150 square miles, has a fine natural harbour at Mudros, two to three miles across and five to seven fathoms deep, with a narrow, rock-guarded entrance. It must be admitted, however, that it is indifferent holding ground, so that vessels there are apt to drag their anchors; and a north or south wind raises a violent sea. During the great storm of wind and rain followed by frost at the end of November 1915, which sent 10,000 sick into our hospitals from the Peninsula, mostly from Suvla Bay, there were two days on end on which no communication save by signal was possible between ship and ship in Mudros harbour, or with the shore. With all these deductions, however, the position of Lemnos, taken with its surrounding islands, has always been an essential to the command of the entrance to the Dardanelles.

Due south of Lemnos is the small island of Hagio Strati; due east is Tenedos, off the Asiatic coast and just south of the mouth of the Dardanelles; north-east is Imbros, just north of the Straits' entrance, with the open roadstead of Kephalos Bay: and north again of Imbros, and to be seen, if you sail from Mudros to Kephalos Bay, towering above Imbros,[1] as Kinglake saw it from the Troad, the mountain mass of Samothrace, "aloft in a far away heaven," whence Poseidon watched at Ilium the battles of gods and men.

But not only is this group of islands—as will be presently shown—vital to the control of the Straits. For the coast-wise seamanship of the ancients it was a fingerpost, pointing to the mariners of the Ægean the gateway of the Black Sea. Lemnos, as noticed already, is equidistant from the easternmost of the great Macedonian promontories and from Cape Helles, about forty miles from each; and, even more important than distance, from Kastro, the ancient Myrina, the chief town of Lemnos, and indeed the only place on the island worth dignifying with the name, either from the shore or from the ruins of the old Venetian castle which stand high on their rock over the town and its little harbour, you may look across the blue waters of the Ægean to where, its base wreathed in clouds, the snow-clad peak of Athos rises grandly into the sky. And though it is only with difficulty that from Cape Helles you can make out the rocky hills of Lemnos, yet the other islands of the group are constantly in view, and thus, without losing sight of land, ships could work from Macedonia to the Straits, or back, as St. Paul, called by his

[1] 5240 feet as against about 1500.

vision into Macedonia, "loosing from (Alexandria) Troad, came with a straight course to Samothracia, and the next day to Neapolis" (Acts xvi. 11).

Persians, Greeks, Venetians, and Turks before our day have in turn held mastery of these islands that command the entrance to the Straits. The Persians took Lemnos under a general of Darius Hystaspis; Miltiades, the tyrant of the Thracian Chersonese—the Gallipoli peninsula—won it (and Imbros) back, and it was held by the Athenian sea-power till absorbed by the Macedonian Empire. The thirteenth and fourteenth centuries of our era saw the great struggle between Venice and Genoa for the Black Sea trade. Genoese influence was more often dominant at Constantinople, but Venice held Lemnos and Tenedos, and in 1380 won the final round. Then came the Ottoman Turk. In 1453 he took

Fig. 1.—Kastro in Lemnos.

Constantinople, but his hold on the Straits was not finally made sure till, two hundred years later, in 1657, after a sixty-three days' siege, Kastro fell. And in the last and greatest of all attempts to win the Straits, which, for all its failure, yet really broke Turkey's military power, Sir Ian Hamilton's headquarters were on Imbros, and Mudros in Lemnos was the base of the fleet and of all supply.

The north side of the Straits themselves, where the British and French effort was made, is of course the Gallipoli peninsula, the south side being that north-west corner of Anatolia which we know as the Troad. Gallipoli peninsula stretches its fifty-three miles of length from the Gulf of Saros to Cape Helles. Its breadth varies from one mile and a half between Cape Helles and Cape Tekke at its southern extremity, and three miles at the isthmus of Bulair, to twelve at its widest part, between Cape Suvla and Cape Uzun. Its coast-line is mostly steep cliffs, one to three hundred feet high, but broken here and there where a nullah or gulley reaches the sea. Inland from the Cape

Helles end the ground slopes up to the commanding hill of Achi Baba (590 feet), behind which comes again the plateau of Kilid Bahr (500-700 feet). But the highest ground of all, and undoubtedly strategically the key of this end of the peninsula, is the ridge of Sari Bair, whence from 970 feet you look down upon the Straits, as on the 9th August 1915, men of the 6th Ghurkas and the South Lancashire Regiment looked down from that ridge from Chunuk Bair.

The control of the Straits as the gateway of the Black Sea or Constantinople means, and has always meant, the possession of certainly one, generally both, of the shores of the Dardanelles. For a variety of strategical reasons Sir Ian Hamilton in 1915 determined to secure the northern side, which is the higher ground of the two and certainly allows the more effective co-operation of a fleet. But the earliest struggle

Fig. 2.—The Castle at Kastro.

we have record of to decide this control was fought out, not on the north side in Gallipoli, but in the Troad. It seems, from the work of modern scholars and excavators, that we may now accept as historical, not only the fact of a Trojan war about 1185 B.C., but also, to a large extent, the existence and personality of the chief actors on each side in the struggle as handed down to us in Homer's *Iliad*.[1] But though Helen and "the face that launched a thousand ships, and burnt the topmost towers of Ilium" may well have been the pretext, we must look deeper, we are told, for the real cause of the expedition. Excavations by Schliemann and Dörpfield at Hissarlik showed that on that site there had stood, at the same time as now ruined Tiryns and Mycenæ flourished in Greece, a great castle which topographically closely corresponded to the details of Ilium given by Homer, with the exception that 3000 years ago the course of the Scamander (Mendere)

[1] Professor J. B. Bury: "The Trojan War" *Quarterly Review*, July 1916.

must have lain farther eastward than to-day. Now examination of the *Iliad* shows that, though the place is nowadays marshy and malarious, and without any good natural harbour, yet Homeric Troy must have been a great commercial centre, having relations north, east, and south with what were later in the early days of Greek colonisation the chief centres of trade, Amphipolis, Cyzicus, Sinope, Miletus; and Dr. Walter Leaf, whose argument has been adopted by Professor Bury, offers an explanation of this apparent inconsistency.

The surface current of water through the Bosphorus and the Dardanelles flows very strongly from the Black Sea to the Ægean, although along the bottom of the same channel there is a river of much salter water flowing in the opposite direction. The Dardanelles, in particular, form a narrow channel, only one mile wide where the European and Asiatic shores come closest together (at "the Narrows"), and through it the current from the Sea of Marmora sets at the rate of two to three knots an hour. It will readily be remembered how greatly this helped the Turkish defence of the Straits by floating mines in 1915 against our naval operations. Furthermore, during winter in the Mediterranean the Ægean and Black Seas form a relatively warm belt, along which centres of low pressure of air move generally from west to east, that is, from the Ægean to the Black Sea. Before the centre of one of these cyclonic depressions reaches the Straits the wind there is south to south-westerly, dropping to a calm when the centre of the depression arrives. Then it passes, the temperature suddenly falls, and a strong north to north-east wind springs up, frequently increasing to a gale, and bringing cold air and often rain from the high-pressure area of the Russian steppes.[1] These are the dreaded Etesian winds, which blow in the Eastern Mediterranean often for days together; and thus, with both tide and wind against them, sailing ships for the Black Sea were apt to be held up for considerable periods at the mouth of the Straits. But the only sources of fresh water supply, at the Scamander and Besika Bay, were controlled by the lord of Troy, who could thus exact tolls at his will, and compel merchants from the Ægean to trade with their fellows from the Black Sea under his conditions. It was this barrier to free trade with the Black Sea that, two generations after they had established themselves in Greece as a ruling caste, became intolerable to the Achæans, and drove them to grasp at the pretext for war with Troy, which may have been offered in the abduction of Helen.

2. The Bridge of East and West.

The whole peninsula of Asia Minor is in reality a bridge between Asia and Europe, just as Syria, between the desert and the sea, is a bridge between Asia and Africa. The bulk of Asia Minor consists of a plateau, 3000 to 5000 feet above sea-level. Round this there is a fringe of low-lying coast-line, much broken on the west into promontories and

[1] Alan G. Ogilvie, "Notes on the Geography of Imbros" (*Geographical Journal*, xlviii. pp. 136-7).

islands. The tableland, with its subdued and monotonous scenery, its great contrasts of summer and winter climate, stands representative of Asia: the Ægean coasts, the scene of the Greek settlements, has all the brightness and variety and charm of Greece itself. Routes from east to west through the peninsula have kept north or south of the great salt lake and salt desert which occupy the heart of the plateau, according as they were attracted to the centre of a power based within Anatolia itself, such as the Hittite Empire, or to a port on the Ægean sea-board, such as Ephesus, with oversea trade relations with Greece or Rome. With the rise of Constantinople as capital of the Empire, roads were naturally directed towards the Bosphorus.[1]

The magnificent natural position of Constantinople was neutralised so long as the Balkan peninsula and the valley of the Danube were filled with barbarous nomad tribes. The removal of this menace as the result of the wars of Trajan and his successors allowed the full development of the city which stood where the route from the Ægean to the Black Sea crossed the natural inter-continental route down the Maritza valley to Adrianople and the Bosphorus, and thence up the Sakaria (Sangarius) valley to the heart of the plateau of Anatolia—the route of the Berlin-Bagdad railway of German ambitions. The only alternatives were either to follow the Maritza valley from Adrianople to the coast, and ferry to Alexandria Troas, a poor harbour, and wind-swept voyage; or to cross at the Hellespont (Dardanelles) shore into western instead of central Anatolia. Under natural and peaceful conditions the bridge from Europe to Asia must be at the Bosphorus.

But given a state of things where this natural bridge is held by a hostile power, or where the Ægean lands—Greece or Macedonia—rather than central Europe and the Danube valley, are the centre of civilisation, then the Dardanelles, not the Bosphorus, crossing becomes the more important. Such conditions prevailed when Xerxes' great army passed by the bridge of boats from Abydos to Sestos to attempt the conquest of Greece; or when, in historic retaliation, Alexander of Macedon, as the representative of Hellenism, invaded the Troad and crushed the army of Persia at the Granikos; or when again the pendulum of the eternal warfare of East and West swung once more back, and the Ottoman Turks turned the flank of the defences of Constantinople by seizing (in 1356) the Byzantine fortress on the site of ancient Sestos, and extending their conquest to include Gallipoli town and the Thracian Chersonese the following year, and a century later Constantinople itself.

Some description has been given already of the Gallipoli peninsula, which is the European side of this Dardanelles bridge. The Troad, the Asiatic half of the bridge, has towards the Ægean cliffs of clayey or sandy marls, which are, save at a few points, as unfavourable to a landing as those of Gallipoli itself; but towards the Straits they are relatively low, with good landing places along the whole Hellespont front of thirty-five miles, and the only good harbour of the Hellespont at the site of ancient

[1] Professor W. M. Ramsay, *The Historical Geography of Asia Minor* (London: John Murray, 1890), pp. 23-4, 43-5.

Abydos, under Nagara Point.[1] With command assured of the higher Gallipoli shore, a landing on the south side of the Dardanelles would not therefore meet with any great natural obstacle. But difficulties only begin with the achievement of the landing. The dominant feature of the Troad is the high range of Mount Ida (*c.* 5800 feet), visible from the Gallipoli shore, which runs first eastward from the Ægean coasts parallel to and beyond the head of the Gulf of Adramyttium, at an average height of over 1000 feet, and then branches, south-westward to enclose the alluvial plain at the head of the Gulf, and north-north-eastward to reach the Sea of Marmora near the mouth of the Aisepos river. The Troad is thus walled off from the rest of Asia Minor by a mountain barrier, easily passable only near the Sea of Marmora where the hills fall rapidly into plain. It is at this point only, therefore, that a force landing in the Troad can easily reach the Sakaria valley and central Anatolia; and Dr. Leaf has shown that it was these geographical considerations which in 334 B.C. governed the Persian strategy, and placed their army to meet Alexander's invasion, not on the Hellespont shore itself, where the higher Gallipoli shore allowed troops to be massed unseen for a surprise crossing, and the barren plateau to landward could afford them no supplies, but about Zeleia in the lower Aisepos valley, just where there is this one gap in the natural mountain wall. Then, when Alexander had crossed unopposed from Sestos to Abydos, and east of Lampsakos had climbed from the Dardanelles coast to the plateau, the Persians marched to meet him to dispute his passage of the Granikos.[2] The battle which followed, on ground favourable to the tactics of the Macedonian phalanx, gave to the invader the mastery of Asia Minor.

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"While sea and rock hold in their accustomed places," has prophesied Frederic Harrison, "the Lord of Constantinople must continue to be the Lord of South-Eastern Europe and of North-Western Asia."[3] History will be able to tell us in the future whether the ingenuity of the Paris Peace Conference proves stronger than the geographical control of a great natural position. But be the fate of South-Eastern Europe and North-Western Asia what it may, he who is to be Lord of Constantinople, with all its legacies of Empire, must be Lord also of the Dardanelles.

THE GEOGRAPHICAL PREREQUISITES OF A LEAGUE OF NATIONS: A REVIEW.[4]

By GEO. G. CHISHOLM.

YEA, the thoughts of men are widened with the process of the suns. Mr. Mackinder, it is true, has always accustomed himself and his readers to

[1] Dr. Walter Leaf, "The Military Geography of the Troad" (*Geographical Journal* xlvii. pp. 403, 410). [2] *Ibid.*, pp. 409-14.

[3] *The Meaning of History*, p. 326.

[4] *Democratic Ideals and Reality: A Study in the Politics of Reconstruction.* By H. J. Mackinder, M.P. With 31 maps or diagrams. London: Constable and Co., 1919.

a wide range of vision; but the work now under review shows an even wider sweep than the paper originally addressed to the Royal Geographical Society on "The Geographical Pivot of History,"[1] in which the idea most extensively developed in the present volume was first put forth. The paper referred to, which at the time roused much keen interest, has for its aim to bring into relief the geographical importance as an influence in world history of the vast region in Eurasia either draining to seas virtually closed to navigation or having no oceanic drainage at all, the region which in that paper is called the heartland. It is the region whose geographical significance has also been considered from a somewhat similar point of view, though with a markedly different drift, by Mr. Cowan in his *Master Clues in World History*. In the present volume the importance of the Heartland is even more emphasised than in the paper above cited. The greater part of the volume is devoted to an exposition of all that is implied in this conception, and the increased prominence which it holds in the author's mind is indicated by its designation being raised to the dignity of an initial capital letter.

But the widening of thought to which reference is made is not chiefly that which is exhibited in this greater fulness of treatment proper to a book as distinguished from a paper, but rather in the attitude forced on Mr. Mackinder, as on so many others, by the crisis which we are passing through. He may differ from Mr. Cowan in his estimate of the favourable results due to previous wars, but he has as full a sense of the horrors of the present crisis as Mr. Cowan would have been likely to express if his work had been a war book. He is thus driven to look boldly into the future, and consider how we are, if possible, to avoid worse horrors to come, and, so looking, he frankly associates himself with those "idealists who, now that the nations are locked into a single world system, rightly see in the League of Nations the only alternative to Hell on Earth" (p. 222). "Idealists," he tells us (p. 9), "are the salt of the earth," but he would have us remember that they may nevertheless work infinite mischief unless they walk hand in hand with the organisers in the true or higher sense of that term, "the *Creators* of social mechanism" (pp. 14-15).

But this, of course, makes it necessary to see that the social mechanism is soundly constructed, obviously a task of exceeding difficulty when the mechanism is one that must embrace the nations as they are, "locked," as already said, "into a single world system." The indication of some of the fundamental facts (the *Realities*, with a capital R, as Mr. Mackinder calls them) that must be recognised if a successful League of Nations is to be achieved is the main, if not the sole, purport of the volume. And among these Realities there is none so persistently urged on our attention as the necessity for preventing the Heartland from being so controlled as to be capable of bursting asunder any such league. "Is it not plain," he asks (pp. 216-17), "that if your League is to last there must be no nation strong enough to have any chance

[1] *Geographical Journal*, vol. xxiii. (1904), pp. 421 *sqq.*

against the general will of Humanity? Or, to put the matter in another way, there must be no predominant partner, or even group of partners, in your League."

This question, with its supplementary interpretation, may be answered confidently enough in the sense in which Mr. Mackinder implies that it must be answered, but his application of the thesis involved may beget in many minds more hesitation, though in his own mind there is apparently no shadow of doubt.

The following quotations reveal his application of the doctrine:—

"The Heartland offers the basis of an all-powerful militarism. Civilisation consists in the control of nature and of ourselves, and the League of Nations must closely watch the Heartland and its possible organisers." (P. 212.)

"The test of the League will be in the Heartland of the Continent. Nature there offers all the prerequisites of ultimate dominance in the world; it must be for man by his foresight, and by the taking of solid guarantees, to prevent its attainment." (P. 221.)

And above all we have (p. 194) the following solemn italicised warning, with reference to which it must be explained that by the World Island Mr. Mackinder means the continents of Europe, Asia, and Africa considered as forming one great aggregate:—

'Who rules East Europe commands the Heartland:
Who rules the Heartland commands the World Island:
Who rules the World Island commands the World.'

In commenting on this somewhat syllogistic chain of affirmation it should be noted that, notwithstanding the emphasis laid by Mr. Mackinder on the Heartland within the limits above given as indicated by most of his maps, the conception of the Heartland is enlarged in the greater part of this volume in a manner which it is hardly possible to reconcile with any principle such as that which enables him to give definite limits to his original Heartland. His enlarged conception is illustrated by a map on page 135 showing the Heartland as embracing, not merely the area of inland drainage or drainage to almost inaccessible seas, but also Asia Minor, with the exception of the western and southern maritime strips, and the rest of the Black Sea basin, together with the Baltic and White Sea basins, and the uppermost (plateau) valleys of the Chinese and Indian rivers. The reasons for this extension are given on pages 141-2. The inclusion of the Black Sea and Baltic basins may, perhaps, be justified on the new principle of distinction, according to which all the area is to be included in the Heartland from which those who own the Heartland would infallibly be able to exclude the wielders of sea-power, but one may well ask how the inclusion of the White Sea basin is to be justified on this principle, and why, if this principle is adopted, a larger area belonging to the Chinese and Indian river basins is not included?

But even if one grants to Mr. Mackinder the widest conception of the Heartland which he bespeaks, some hesitating queries will still arise in our minds. One may indeed recognise that it would certainly be a danger to any League of Nations if such a vast region were firmly

held in a single military organisation, and that therefore it would be reasonable in the formation of any such league to take such precautions as may be taken against such a possibility. Still, is this danger so supremely great as to make this consideration so decisive as it appears in the eyes of Mr. Mackinder? If we are to think of a League composed of nations still distrusting one another as they now do, still, in spite of the experiences which have compelled Mr. Mackinder to think that the only alternative to a League of Nations is "Hell on Earth," confident of some national gain to be made by disloyalty to the League, are there no other possibilities to be faced just as menacing, perhaps more immediately menacing? Mr. Mackinder shows no sign of having ever been troubled by such a reflection as that of Mr. Cowan in the work already mentioned (pp. 290-1): "If white aggressiveness continues to goad China into militarism, there is no saying what may happen." He thinks of China only as a possible cat's-paw (for Germany) or as a country under tutelage. "It is," he says (p. 227), "the plain duty of the Insular peoples [broadly all the peoples outside of the Heartland] to protect the Indians and Chinese from Heartland conquest" It is all very well to ignore the possibilities originating in China itself, but one is reminded of the British member of Parliament, who some twenty years ago after a brief visit to Japan expressed astonishment at the fact "that the Japanese Empire should have been brought in less than a quarter of a century from barbaric darkness and isolation to a leading place in the civilised world."

But in Mr. Mackinder's volume there is a great deal more of a suggestive nature than what relates directly to the Heartland. He sees other prerequisites for the success of a League of Nations than securities for the due balance of power, and among these several are mentioned of which it may be said that they betoken aspirations which are strongly held by many others. At the very outset (p. 8) he asks, "What conditions must be satisfied if we are to succeed in harnessing to the heavy plough of Social Reconstruction the ideals which have inspired heroism in this war?" Yes, that is a prime need, and in his concluding chapters, more particularly in the last of all, the author gives his ideas as to how this may be brought about. It might in fact be suggested that it would be well for readers not familiar with the author's modes of thought and expression to begin by reading the pages, say, from 236 onwards. Not that those pages are misplaced in the development of his argument, but the reader, having the knowledge of the goal in his mind, might be better prepared to follow the line of thought by which that goal is reached.

Mr. Mackinder recognises (p. 222) that "the temptation and opening to World-Empire" might be removed, that "fraternity is of the essence of successful democracy, the highest but the most difficult of all modes of government" (p. 237), that "for the contentment of nations we must contrive to secure some equality of opportunity for national development" (p. 235), so as to ensure the spirit of fraternity between peoples requisite in a democratic League of Nations. Finally, he says, "Whether we reason downward from the Freedom of Nations, or upward

from the Freedom of Men, we come to the same conclusion. The nation which is to be fraternal towards other nations must be independent in an economic as in every other sense; it must have and keep a balanced life. But it cannot be independent if it is broken into classes and interests which are for ever seeking to range themselves for fighting purposes with the equivalent classes and interests of other nations. Therefore, you must base national organisation on provincial communities. But if your province is to have any sufficient power of satisfying local aspirations it must, except for the federal reservations, have its own complete and balanced life. That is precisely what the real Freedom of Men requires—scope for a full life in their own locality. The organisation of nation-wide classes and interests is the outcome of conflict, but it cannot satisfy, for it removes the larger careers away to the metropolis. Moreover, the slums, and most other material afflictions of the people, are the outcome of impotence of local life, for they all result from offences against the principle of keeping that life complete and balanced.

"Provinces of complete life, of course, imply a federal system. It is not a mere decentralisation which is contemplated, but decentralisation by the different social functions to the same local units. Undoubtedly that is the tendency of the present time in the Anglo-Saxon world in regard to the administration of government. The United States, Canada, Australia, and South Africa are all, in greater or less degree, federal, and in Britain we seem to be not very far from becoming so. Only the Irish question blocks the way, but it is intrinsically a small question, and we ought not to allow the quarrels of four million people to impede permanently the organic remedy of the ills of more than forty millions. A division of England into Northern and Southern Provinces would probably be needed in order to remove the fact of the predominant partner, but from the point of view here taken that division would in itself be a good thing."

Mr. Mackinder is fond of abstract terms, terms sometimes so abstract that it is difficult, if not impossible, to make sure of the content of the ideas represented by them. To take an instance presented by the passage just quoted; one cannot but ask what exactly is meant by the complete and balanced life of a province? Without a full answer to that question the suggestion made in those paragraphs is somewhat nebulous.

The life of a few tribes, say, on Arctic shores or in the interior of South America or New Guinea, out of contact with the rest of the world, must be balanced after a fashion, else it would not go on at all, and nearer home the inhabitants of some of the Outer Hebrides come pretty near a similar balanced life. But, I presume, Mr. Mackinder would point out emphatically that their life is not complete. No doubt, but how much is requisite to entitle it to be called complete? The federated regions proposed for the British Isles belong to a country which is, and, it is to be presumed, must always remain very largely dependent on foreign commerce for the very necessaries of life, including the simple luxuries in universal use, and it is difficult to imagine any method by which each of the different parts of the federation would be enabled to

supply directly its own share of the goods necessary to pay for those commodities. It is true that Mr. Mackinder desiderates a less one-sided industry for the country as a whole. And it may be allowed that the whole tendency of economic development has long been in the direction of a more balanced division of agricultural and manufacturing industry all over the globe, although in our own country and some parts of other countries that tendency is masked by the consequences of the rapid growth of world trade, the still continued agglomeration of population in ugly manufacturing areas, the existence of which Mr. Mackinder bemoans as I do.

But, however difficult it may be to remedy this evil, I agree with Mr. Mackinder in the belief that thinking beings who recognise its existence with intense repugnance cannot be content to look upon it as remediless, and I will venture on one suggestion by way of a slow approach to a remedy. To me it seems that the best way is to face frankly the fact of the nations being now "locked into a single world system," and to endeavour to discern all the implications of that fact. Turning it constantly over in my mind for many years, I have been more and more driven to the conclusion that the root of the economic difficulty in the manufacturing hives of the earth is to be found in the unremunerative agriculture of such countries as India and China. It is in agriculture that we first come up against the fact that increased labour, even increased labour and capital, does not always give proportional results in product, and where wants are few, and foresight correspondingly small, the provision of capital to aid labour is apt to fall short. Unaided labour fights on with a scantier reward and diminishing purchasing power. It is to such populations that we have to sell our cottons at prices which they can afford to pay, and it is such a population that feeds the towns in India with factory workers that keep down the wages of competing workers at home. This latter effect is disguised by the fact that gigantic industries still keep going and gigantic fortunes may still be made. But even business men recognise the deceptiveness of huge industries as an indication of prosperity. "Increasing iron production," said a German iron-master before the war,[1] "may betoken increasing wealth, but it may also betoken increasing poverty, or at least indicate that the people must meet the menace of impoverishment due to the growth of the population, by an ever growing expenditure of force." Whether this is specially true of the iron industry I am unable to say, but I am quite prepared to believe that it is true of that industry.

And, if what I have advanced is true, where is the remedy, whether slow or speedy? The only remedy that I can suggest is for us to do our best to see that those agricultural classes are provided with an education that will be likely to rouse their interest in, and render them more fitted for the prosecution of their industry, and with banking facilities

[1] Ernest Gunther of Essen in an article on "Die internationale Stellung der Eisenindustrie," in the *Jahrbuch für Gesetzgebung, Verwaltung, und Volkswirtschaft*, vol. xxxviii. Third Part, p. 319.

enabling them to turn that education to account so as to get a better return for the labour expended. Such education would no doubt favour their learning and keeping in mind what is the most profitable size of holding for any given locality, and that again, one would fain hope, might lead healthily to a better adjustment of population to available land.

In connection with this another consideration arises. We are constantly told at the present time that to make good the losses and meet the liabilities incurred by the war, we must enormously increase our production, and business men point out to us the economies that may be effected so as to render that enhanced production possible. These proposed economies relate chiefly to the turning out of greater quantities of manufactured goods. But in exchange for our manufactured goods we buy chiefly raw produce, and these economies can serve only indirectly and inadequately to increase the production of such imports. The result to be anticipated, therefore, is that we shall have to give greater quantities of manufactured goods for the same quantity of raw produce. In other words, the more effective our economies in production are the more will the prices of manufactures tend downwards relatively to those of the goods we get in exchange. In a note contributed to the *Economic Journal*, No. 88 (Dec. 1912), Mr. J. M. Keynes pointed out, on the basis of an examination of official tables showing, for each of the years 1900 to 1911, the estimated value of the imports and exports of the United Kingdom at the prices prevailing in 1900, that the comparative advantage of trade during that period was moving sharply against industrial countries, and he considered that that was "of course" due to the operation of the law of diminishing return for raw produce. If that is so, is the accelerated production of industrial countries after the war not likely to lead to a still sharper movement in the same direction?

When I said above that I would *venture* to make one suggestion of a remedial nature, I said so, not as a mere manner of speech, but with full consciousness of its venturesomeness, well aware that the suggestion is one that raises enormous difficulties, the nature and extent of which I cannot pretend to have thought out. That being so, I should hardly have thought it right to express such an idea in public at all if I were not encouraged by finding that similar ideas are occurring to others in various parts of the world. I would plead that as a justification for appealing to those whom this article may reach, and especially those whose thoughts tend to run on different lines, for comments that may aid me to criticise, and perhaps revise, my own thoughts.

Meantime, however, I would add that, holding such ideas, I have from the first been disposed to look upon the clause in the covenant of the League of Nations providing for the establishment of an international labour bureau as one of the most important of all; and, indeed, I cannot but think that the successful working of the League as a whole will depend very largely on the good fruits that may grow out of this provision.

Mr. Mackinder sees nothing but evil in international class movements. I should have the same view if I thought it inevitable that

such movements implied hostility between class and class. True, at the present time appearances tend that way, but that would surely be altered if it came to be recognised that in all parts of the world the classes economically most favoured were eager, in their own interest, to improve so far as possible the condition of those who are less favoured, all classes discerning that permanent improvement must be based on economic law. Water does not naturally run up hill, but we can easily make it press upwards with almost irresistible force; not, however, by ignoring the laws of its action, but by studying and applying them.

And it seems to me that if the removal of competition based on degraded and degrading standards of living could be realised, we should then be in a better position to effect some of the aims of Mr. Mackinder with which I am heartily in sympathy, although I have never been able to see how they are to be carried out. I have already, on more than one occasion, expressed my ardent longing for a more nearly balanced industry in our own country, and it seems to me that this would at least reduce the obstacles in the way of a more evenly distributed industry within the country.[1] "The only organic remedy," says Mr. Mackinder (p. 250), "is to loosen out the town." "With all my heart," as Carlyle used to say, but how are we to manage that? The motor, which has the same advantage over railways that railways have over canals, of bringing a greater number of nooks and corners into communication with one another, may help us here, but all the more easily if the changes above sketched out have first been effected.

There are numberless other suggestions in the work now reviewed which will be sure to interest a variety of readers, but I have confined myself to the main points. I do not wish to conclude, however, without bearing testimony to the stimulating character of the volume, of which one may say that it would form an excellent text-book for a teacher of geography who had ample time at his disposal, and who conceived it as his first duty to get his pupils to use their own thoughts, and not to swear to the dicta of any master. It is a pleasure also to recognise the spirit of earnest sincerity in which the book is written, the evident desire which it shows to treat divergent views with respectful fairness. It might, however, be hinted that this might be carried even further. Mr. J. R. Clynes a short time ago said, in speaking of some difficult problem then actively discussed, "It 's no use slanging the Government." Quite true; in dealing with such perplexing questions as are handled in this volume it is no good slanging anybody. Mr. Mackinder in truth slangs nobody. But he does administer a mild rebuke to our past selves for want of foresight. "Our method for a century past has been to drift." His reference is to the following of an extreme policy of *laissez faire*. But we must remember that this policy was at one time adopted without any suspicion of drifting. One of the ardent followers and admirers of Cobden, Dr. Andrew Combe, even goes so far as to

[1] See an article in this *Magazine*, vol. xxv. (1909), pp. 574-6, and the paper read by me to the Royal Statistical Society in 1890 there quoted (from vol. liii. of the *Journal* of the Society, p. 584).

include him among those whom he gently upbraids for not having, in the advocacy of that policy, "a *clear* perception that they were advocating the scheme devised by Providence, supported by its power, and sanctioned by its wisdom."[1] And at the present juncture, while those who have drawn up a covenant of a League of Nations which does not fulfil Mr. Mackinder's condition of containing "no predominant partner or even group of partners," are, no doubt, convinced that they have framed it with all due care and foresight, there are others who may think that that covenant is the result of drift. It is at least a covenant which contains little to remind us of President Wilson's insistence on the view that "the right attitude of mind, the right feelings of the nations towards each other, are just as necessary for a lasting peace as the just settlement of contentious territorial questions and of questions of nationality"; which is more in accordance with Prince Max of Baden's aspiration after a League of Nations "not as a mere League for the prevention and punishment of breaches of law, but as a community of nations trusting each other, with a creative force which heals, and helps, and builds up."

PUBLIC ADMINISTRATION IN THE HIGHLANDS AND ISLANDS OF SCOTLAND.[2]

By Sir Leslie Mackenzie, M.A., M.D., LL.D.

"The only merit claimed for this book," says Dr. Day, "is that it presents, in what is, it is hoped, a convenient form, a consecutive narrative of public administration in its various aspects in the crofting counties of Scotland, together with a description of the present administrative machinery, and statistics necessary for forming an opinion as to the financial position in the year before the commencement of the Great War. In essence the book is a précis of Government reports presented without any conscious partiality or bias, and with no desire to prove or disprove anything" (p. 373). These modest sentences do not convey an adequate idea of the masses of carefully sifted material that constitute the volume. Dr. Day sets himself to show the working of Government machinery in a concrete case. The analysis of the governing bodies, central and local, applies, in large measure, to all Scotland, not to the Highlands and Islands alone. This is inevitable; but it enables Dr. Day to show just where the weakness lies in applying a general system to the marginal case. Personally, I am glad to have an opportunity of reading for a purpose a book like this; for it lets me see how the facts of administration present themselves to the student of the general position. It helps to restore the perspective to the day's

[1] *Life of Andrew Combe*, by George Combe, p. 492.

[2] *Public Administration in the Highlands and Islands of Scotland*, by John Percival Day, B.A., B.Sc. (Lond.), D. Phil. (St Andrews), Fellow of the Royal Geographical Society, etc. London: University of London Press, Ltd., 1918, price 25s.

work. It is thorough, almost mercilessly thorough, yet fascinating to those concerned to understand the whole machinery of a real administrative problem. As a worker in the machine, I welcome such a study, and I should like to see every main section of our polity subjected to the same sort of analysis by as competent a scholar. Here the student of administrative institutions will find, in a simple setting, "the structure of the executive" from the Crown in Parliament down to the dozen or more local bodies through which the purposes of the community are made real on the spot. Among books on Scottish government, I do not know of one that contains a greater amount of relevant information more compactly arranged. To summarise this summary is impossible: the book is too condensed for that. All I can offer is a few observations.

From the map it is easy to see why the Highlands and Islands are an administrative difficulty. When a population approximately equal to the city population of Edinburgh is scattered over three-fourths of Scotland and parcelled out among the hills, the valleys and the islands, the mere geographical dispersal gives rise to innumerable problems of feeding, housing, transit, and the like. This would be true even if the dispersed people all belonged to a single variety of civilisation. But in the Highlands and Islands are to be found strata of many civilisations. There are differences in belief, in custom, in variety of segregation, in economic sufficiency, in race, in political affinity. In every Government department—poor law, lunacy, public health, agriculture, fisheries, prisons—all these factors have to be reckoned with, and unending records show how difficult the individual problems are. Among the islands there is scarcely one that has not its little internal war between the local middle-man and the island producer, or between the crofter and the big estate, or again between the land interest and the industrialised fishing islands or towns, or between sections of the same island, where, perhaps, racial traditions block the way to complete assimilation, or again between different religious groups each claiming divine rightness for its own doctrines. Such mental segregations and specialisations often block the way to successful administration. These and such as these are the motive forces that have generated the complex machinery put before us in this book. The variations in the machine are reflected in the long series of commissions and committees that have had to investigate every phase of social life in the Highlands and Islands. The reports are only a record of efforts to compose the struggles of these variously civilised groups to maintain themselves first against nature and next against their domestic enemies. Only a generation or two ago, it was "war to the knife" in the literal sense. To-day the struggles are as keen, but the methods of fighting are rather more polished. But the kind of fact we constantly run up against is this: that conscription made almost no difference to the island of Lewis, because nearly all the men of fighting age had already joined some fighting unit of land or sea; or, again, that one of the island groups most affected with tuberculosis sent relatively high proportions of men to the Navy; or that, in one parish of some seven thousand people, there are said to be twenty-two "places of worship," representing at least four,

if not five or six, Protestant denominations; or, once more, that the Highlands and Islands send to the universities from ten to twelve times as many persons in proportion to population as the rest of Scotland. (The last fact I learned many years ago from another Dr. Day, late Rector of the Grammar School of Old Aberdeen, who had the arranging of secondary departments for the Highlands Committee.) A tutor of Oriel once told me that the best philosophical student he had had in thirty years came from Stornoway. Recently, a book on the nature of "community" has come on the philosophical world from "a young Canadian professor," who went to Canada *via* Oxford, from Lewis. How easy it would be to load pages with such facts, or with flashes of beauty from the lochs or voes, or romantic tales of old adventure, or romantic songs from the living old world of music revealed to us by Mrs. Kennedy Fraser! These things I name merely because they must be thought of as signs of the informing spirit whose organised embodiment for the purposes of our rough administrations Dr. Percival Day's book puts before us. Machines do not move of themselves, even Government machines. But the efforts of generation after generation to bring the Highlands and Islands within the working polity of modern Scotland make a pathetic record, whether we think of the suppressed clan system (p. 76) with its tribal wars, or the Scots Poor Law, beginning in 1424, and failing, by branding on the cheek, as it fails to-day by the poor-house "test," to master or provide for the marginal citizen (p. 77), or, again, "the various clearances," whose memory, in some glens, is as bitter to-day as on the day they happened, or the abortive efforts to clean the islands of their people by emigration (p. 90), or the failure of the potato crop (p. 96), or the crofters commissions, fisheries committees, medical committees, medical reports, attempted colonisations, medical service, and a dozen other things. In Dr. Day's volume they can be found one and all with facts and references. Some may find a greater interest in the fight between the great estate and the small crofter; others, in the long series of failures that ended in placing some of the islands in the front rank of educated communities; others, again, may prefer to study public health, or means of communication, or fisheries. For each of these, the reader will find relevant facts.

The various commissions and their renderings do not entirely escape criticism; but, for my own part, I should like to see rather more radical analysis of the land problem. I have not come across here anything to explain the "land hunger." Perhaps it did not come within Dr. Day's intention; but I have the feeling that, in the matter of housing, he can get nearer fundamentals than he has done in his criticisms of the Housing Commission's proposals.

What is the "conclusion of the whole matter"? Dr. Day's concrete proposal is that a central Highlands and Islands Department should be established; that the Highlands and Islands should be treated overtly and systematically as a special problem; that they should be regarded as essentially a "nursery" of strong men, and developed primarily from that standpoint. It is just here that I miss the elaborated argument necessary to drive the conception home. Many years ago, a member

(now dead) of the Congested Districts Board told me quite brutally that his policy had always been to clear the Hebrides of their people, for those islands were unfit for habitation! The Congested Districts Board is gone: the islands remain. That is the stubborn fact that gives significance to this excellent volume. Later, perhaps, Dr. Day will follow up his "nursery" idea by a more intimate sociological study of the people and their dreams; but we are grateful for the book he has given us, which has meant to him many a weary spadeful.

AUSTRALIAN RAINFALL.[1]

SINCE its inception some twelve years ago, the Australian Commonwealth Bureau of Meteorology, under the vigorous and wise direction of Mr. Hunt, has done much excellent work. At the outset it was fortunate enough to enlist the services of Dr. Griffith Taylor as physiographer, and various attractive papers have come from Dr. Taylor's pen. But for financial difficulties the present very substantial memoir would, in ordinary course, have been published by the Bureau, but its practical importance determined the Advisory Council of Science and Industry to undertake its publication. The sub-title—"A regional study of the topography, drainage, vegetation, and settlement; and of the character and origin of the rains"—indicates generally the scope of the memoir, and in view of the enormous economic importance of the meteorological factor in Australia and the admirable manner in which Dr. Taylor has carried out an ambitious scheme, we take it that the Council had no hesitation in accepting responsibility.

Including Tasmania, the Australian continent, with its great area—nearly three-quarters that of Europe—its wide extent in latitude from 10° S. to 40° S., affording a wide range of temperature conditions, and its great breadth along the tropic of Capricorn which distinguishes it from the other great southern land masses, affords an attractive field to the geographer and climatologist. Moreover, the more northerly parts of it fall within the region of the south-east Trades, and the orographical features are very sharply marked—the Eastern Highlands separated from the great Western Plateau by a wide belt of land of slight to moderate elevation running from north to south. Mr. Hunt had many years ago shown that the dominating factor in Australian meteorology was the procession from west to east across the continent of high pressure areas, with the track of their centres oscillating roughly between the latitude of Brisbane in mid-winter and that of Melbourne in mid-summer, and flanked to the north by tropical and to the south by Antarctic "lows." The seasonal swing of temperature, too, had been

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[1] *The Australian Environment (especially as controlled by Rainfall).* By Griffith Taylor, D.Sc., of the Commonwealth Bureau of Meteorology, Commonwealth of Australia. Advisory Council of Science and Industry. Memoir No. 1. Large 4to, pp. 188. Illustrated by 15 contour Maps in colour, a Solar-Control Model, and 167 other Maps and Diagrams. Melbourne, 1918.

noted—the isotherm of 70° runs roughly through Port Lincoln in July and through Daly Water nearly 1400 miles to the south in January—and it had been fully appreciated that Australia afforded a remarkable field for the study of solar control of climatic phenomena. Such general considerations have been studied earnestly by Dr. Taylor, and he presents with well-justified pride a working "Solar-Control Model" of cardboard which illustrates in a very striking manner the relation between the sun's change in declination and the position of the anticyclone belt, the permanent winds, and the month-to-month rainfall in Australia. Dr. Taylor has found this model extremely useful for demonstration purposes, and we commend it to the attention of teachers as a well-conceived and inspiring piece of work.

Treating Australia as a whole Dr. Taylor presents some original rainfall studies along fairly obvious lines. For example, he has a "rainfall reliability" map, in which, for a twenty-year period, the average percentage variation from the normal of the annual rainfall is charted. In the driest central area, where the rainfall may be only 5 in. or so, a variability of $\pm$ 50% represents merely a high degree of eccentricity, and in the extremely unfavourable portion of the west coast from Carnarvon to Condon a similar high variability is characteristic of what is really part of the "trade wind desert." At Onslow, for example, in that region the annual rainfall has ranged from 1 in. in 1912 to 27 in. in 1900! But in the regions of fairly uniform rains the "isopleths" of Dr. Taylor's map have a real economic meaning and call attention, for example, in an arresting manner to the very favourable climate of "Swanland," *i.e.* the extreme south-western corner of Australia, where the rainfall is adequate throughout the year and highly reliable. A complementary map is given indicating the seasonal uniformity of rainfall, and this map suggests various reflections. Thus the northern littoral is rainless in "winter" and bare of forests.

Some very general studies of the distribution of vegetation are submitted, and Dr. Taylor suggests that the "hythergraph," a temperature-rainfall diagram, is significant as indicating by comparison with other countries the possibilities of various parts of Australia; but we feel that this line of inquiry should not be overstrained. Again, we are doubtful if the "climograph," a temperature-humidity diagram, is very useful in comparing one part of the globe with another as regards the health, comfort, and working powers of man. Indeed, we invite Dr. Taylor to consider whether his "composite white-race climograph," based on the average of "twelve typical cities," including climates so different as those of Aberdeen, Chicago, and Sydney, has any real meaning.

Five-sixths of the volume are devoted to regional studies, and these have distinct practical bearings on Australian economics. Dividing Australia into fifteen type-regions, we have for each an admirable coloured orographical map with isohyets charted on it. These afford the opportunity of studying the influence of topographic conditions on the distribution of rainfall, conspicuously in "Swanland" and in eastern districts. For each region the general physiography, drainage, hydrography, and distribution of vegetation are discussed; correlations with other parts

of the world are indicated; questions of health and economics are touched on; the seasonal distribution of rainfall is examined; and the rainfall of each of the five years 1910-1914 is analysed in relation to various combinations of pressure system. Finally, a set of daily weather charts is given for each region, showing the typical "rainfall origins" for the various parts of Australia—charts that must prove of immense value to the forecaster in that country.

The memoir must have involved an immense amount of study, but nowhere is it laboured. Here and there it is almost of necessity "sketchy," but throughout it is interesting in a high degree. Printer, lithographer, and binder have combined to give an excellent piece of work a worthy dress. A. WATT.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

SCOTTISH GEOGRAPHICAL MAGAZINE.

No August number of the *Magazine* will be published this year. The *August* and *September* numbers will be amalgamated, and will be issued to the members on the 1st September as a special "Edinburgh" number. This number will contain numerous maps, plans and pictures of early Edinburgh, and a coloured map, presented by Dr. Bartholomew, showing the gradual expansion of the city.

CLEANING OF THE ROOMS.

The Rooms of the Society will be closed to members during the month of August for cleaning.

THE SOCIETY'S SILVER MEDAL.

The Society's Silver Medal has been awarded to William F. Gillies, first in the merit list in the Geography Class at Edinburgh University.

GEOGRAPHICAL NOTES.

EUROPE.

Mineral Production in Relation to the Peace Treaty.—Prof. H. Louis contributed to *Nature* for May 15 an article on this subject, in so far as it could then be discussed on the basis of the published outlines of the Peace Treaty. First, in reference to coal, he points out that in 1913 Germany produced rather more than 190 million tons of this mineral, of which about 100 millions came from the Westphalian field, 34 millions from Upper Silesia, and 15 millions from the Saar coal-field. The Saar coal-field is allocated to France in compensation for the destruction of her important northern fields. But in 1913 the Pas de Calais district produced about 22 million tons, and the Nord district about 8 millions, so that the compensation does not seem to err on the side of liberality. Prof. Louis expresses the hope that under

Section VIII. ("Reparation and Restitution") Germany will be compelled to deliver to France as much coal as will bring the total coal supplies of the country up to at least the pre-war standard, until her northern coal-fields are in working order again. Again, it would appear that parts at least of the Silesian coal-fields are to be delivered up to Poland. But, even if the whole of these fields were given up, Germany would have an output in bituminous coal alone equal to three-fourths of her pre-war standard, while if lignite is included in the calculation, her annual output would be diminished by 18 per cent. only.

Germany's supplies, both of iron ore and of potash, are of course affected by the restoration of Alsace-Lorraine to France. The German output in 1913 of minette iron ore was 28½ million tons, of which more than 21 million tons were produced in Lorraine. The opinion is expressed that in the details of the clauses under which Germany renounces her treaties with Luxemburg, conditions should be included which will favour the delivery of the minette ores of that country to Belgium rather than to Germany. This would help to restore the great iron industry of Belgium, which Germany set herself to destroy. Even without any minette ore at all, Germany would still have an annual production which could be brought up to 10 million tons per annum, or say 5 million tons of pig-iron, as against 14 million tons in 1913. This, it is calculated, would be sufficient for the industrial needs of the German nation, while putting a check on her pre-war huge output of munitions of war, and thus protecting France against aggression.

As regards potash supplies, the conditions are rather different. The Alsatian beds are purer and richer than those of Germany proper, but the jealousy of the older German companies checked development before the war. Some years must therefore probably elapse before the production in Alsace becomes large. It is suggested that meantime Germany should be made to supply raw potash minerals rather than the refined product, the refining being done in chemical works in this country.

Summing up, Prof. Louis regards the terms, in so far as they relate to minerals, as doing bare justice only to France, while he considers that Belgium is entitled to something more than she seems to be receiving.

Africa.

Expedition to East Central Africa.—Under the auspices of the Royal Society, an expedition left this country recently to make a scientific study of the pastoral peoples of East Central Africa. The tribes to be visited are the Gallas near Mombasa, the Kikuyu and Masai at Nairobi, the Ziba and Watuturu near Bukoba on the west and south-west of Lake Victoria, the Bahima of Amkole, the Banyoro, the Bagesu on Mt. Elgon, and the Gallas on the frontier of Abyssinia. Then, following the Nile to Khartum, it is proposed to see as many Nilotic tribes as possible, paying special attention to the Banyuli and Badamu. The expedition is under the direction of the Rev. John Roscoe, formerly C.M.S. missionary in Uganda, and the funds have been supplied by the

generosity of Mr. J. P. Mackie of Glenreasdell. The Royal Society has appointed a committee to undertake the administration of the funds, of which Prof. A. Keith is chairman. The object of the expedition is to make a careful study of the social and economic conditions of the various peoples, and of their relationships to one another.

America.

The Rainfall of California.—Mr. Andrew H. Palmer, of the U.S. Weather Bureau, contributes to the *Journal of Geography* an article on Water-power in California, which contains a number of interesting details in regard to the precipitation in that country. The State, with an area of 160,000 square miles, about one and a third that of the whole United Kingdom, is the second largest in the Union, and both for this reason and because of its varied relief, shows much variation in climate. Thus the precipitation varies from 1-2 inches per annum in the Mohave district to over 100 inches in the Sierra Nevada. Further, while in certain areas the greatest known snowfall in the United States occurs, in others snow has never fallen in measurable amounts.

Broadly speaking, precipitation increases from the south-east to the north-west, and while the mountains are regions of high precipitation, the interior basins and the south-eastern plateau regions show a marked deficiency. In the Sierra Nevada the average annual precipitation increases up to a height of 5000 feet, with an average increase of 8·5 inches for every 1000 feet of rise, and above the 5000 ft. line diminishes. The whole State, as is well known, shows the Mediterranean type of rainfall, with winter rains and summer drought, but while in southern California about 90 per cent. of the total falls in the winter half year, in the north the percentage drops to 75. The heaviest recorded fall for one calendar year is 156·9 inches at La Porte in the Sierra Nevada, at a height of 5000 ft. Further, since most of the annual fall occurs during six months of the year, heavy falls over short periods are frequent. The following are interesting records:—71·5 inches in the month of January at a height of 2750 ft.; 16·7 inches in twenty-four hours at a height of 5280 ft.: 11·5 inches in one hour and twenty minutes at a height of 2543 ft., the last, curiously enough, being an August record. The significance of these figures in connection with flooding at the lower levels will be obvious. On the other hand, there are records, for stations in the lower grounds, of periods varying from over two years to thirteen months in length, when no measurable amount of rain fell; while in the depressions, such as Imperial Valley and Death Valley, there are several records of yearly periods with less than half an inch.

The height of the mountain areas, and the season of precipitation, mean naturally that the snowfall is abundant. Tamarack, in the Sierra Nevada, at a height of 8000 ft., has a winter snowfall of over 43 feet, as estimated from a record of eight consecutive years. In the higher parts of the Sierra Nevada 100 inches of snow fall every winter, at nearly all the stations, and 40 to 50 feet of snow have been known to accumulate on the ground at the same time.

The well-marked relief and the heavy precipitation on the heights mark California out as a country with great reserves of water-power, and the fact that the rocks in the mountains are mostly impermeable granites means that there is little loss of surface water by percolation. On the other hand, there has hitherto been a marked divergence of interest between the agriculturists, who require the water for irrigation, and the companies interested in power schemes. The fact that the dry season coincides with the period of greatest heat means that the land requires water in large amounts in summer time, while the power stations are of course interested in securing a regular flow throughout the year. Mr. Palmer, however, considers that the interests of the two parties can be reconciled, and looks forward to a great development of hydro-electric plants in the State.

New Outline Map of the United States.—We have received the following from the Department of Commerce, Washington:—The U.S. Coast and Geodetic Survey, Department of Commerce, reports the completion of a new outline map of the United States on the Lambert Conformal Conic Projection, scale 1 : 5,000,000, dimensions 25 × 39 in. This map is intended merely as a base to which may be added any kind of special information desired. The shoreline is compiled from the most recent Coast and Geodetic Survey charts. State names and boundaries, principal rivers, capitals and largest cities in the different States, are the only information otherwise embodied. The map is of special interest from the fact that it is based on the same system of projection as that which was employed by the armies of the allied forces in the military operations in France. To meet those requirements, and at the request of the Army, special publications were prepared by the Coast and Geodetic Survey.

The value of the new outline map on the Lambert projection can best be realised when it is stated that throughout the larger and most important part of the United States—that is, between latitudes 30½° and 49°—the maximum scale error is only one half of one per cent. This amount of scale error is frequently less than the distortion due to the method of printing and to changes from the humidity of the air. Only in southernmost Florida and Texas does this projection attain its maximum error of 2⅓ per cent.

The Lambert projection is well adapted to large areas of predominating east and west dimensions such as the United States, where the distance across from east to west is 1⅓ times that of the distance north and south. Special features of the projection may be stated briefly as follows:—(1) The Lambert Projection is conformal, that is, all angles between intersecting lines or curves are preserved; and for any given point (or restricted locality) the ratio of the length of a linear element on the earth's surface to the length of the corresponding map element is constant for all azimuths or directions in which the element may be taken. (2) The meridians are straight lines and the parallels are concentric circles. (3) It has two axes of strength, the standard parallels of the map of the United States being latitudes 33° and 45°, and upon

these parallels the scale is absolutely true. The scale for any other part of the map, or for any parallel, can be obtained from Special Publication No. 52, page 36, U.S. Coast and Geodetic Survey. By means of these tables the very small scale errors which exist in this projection can be entirely eliminated.

Pulque and the Mexican Agaves.—The Agaves—commonly called "aloes" in this country—are botanically remarkable for their slow growth during the prolonged vegetative period, and the rapid development of the huge flower spike at the close of this period. After the flowering the plant dies; it may thus be regarded as an annual whose period of growth is retarded by the climatic conditions. Since the plants are natives of arid climates, and show all the characteristics of xerophytes, the rapid growth of the flower spike necessarily involves a large preliminary accumulation of sap. It is this sap which, after fermentation, yields the Mexican intoxicant known as pulque, and the fact that pulque is the national beverage involves a whole series of geographical factors, some of which are of great interest. The *Bulletin* of the Pan-American Union for March last devotes an article to the subject, which, though somewhat journalistic in style, contains many interesting facts and some admirable illustrations.

The agaves of Mexico are very numerous, and some ten of them are suitable for the manufacture of pulque. The plants have a wide range, but are chiefly grown on the plateau at heights of from 2200-2700 metres (about 7200-8850 ft.). Plantations are made by utilising the suckers which spring from the roots of the old plants, these young plants being set at wide distances apart in ploughed but unmanured land. Barley, maize, etc., are sometimes grown between the rows, but otherwise the plants are merely left to mature, a process which may take four to seven years. The embryonic flower spike is then removed, and a hollow scraped out at the top of the stem. Into this hollow the sap exudes and is collected by suction into a gourd every day, and then emptied into a sheep or goatskin receptacle carried on the collector's back. The daily yield of the sweet fluid is two quarts to one gallon, but the plant rarely lives more than 120 days after the beginning of the process. The juice is run into ox-hide vats, and allowed to ferment, scrapings of the pulp of the plant being added. The liquor produced resembles a sour cider, and has a disagreeable odour; it is not, when fresh, a strong intoxicant, but very rapidly undergoes a further change, when it acquires an unpleasant taste and smell and the percentage of alcohol increases. In addition to pulque a much stronger spirit, called mescal, and comparable to whisky, is made from agave juice. The fresh juice, in the unfermented condition, is known as aguamiel, and is reputed to have marked medicinal qualities. The fact that it ferments spontaneously with great rapidity, however, makes its use limited to the area of large-scale production around Mexico City.

Enormous quantities of pulque are consumed in Mexico, and the manufacture of the sheepskins in which it is carried is a considerable industry. It is obvious that in addition to the climatic conditions

involved, its production on any scale demands a large labouring class of low economic standard, to carry out the daily collection of juice from the vast plantations.

Australasia.

New Caledonia.—The new French journal, *Colonies et Marine*, is, as is natural, devoting a considerable amount of attention to the resources and development of the various French colonies, and in the issue for November-December 1918 there appears an article by the deputy M. Laclave La Plagne, on New Caledonia. The article is illustrated by a sketch-map and a number of plates, and special attention is devoted to the question why the colony remains relatively undeveloped, despite its mineral riches and great potentialities in regard of agriculture. In this country it is often stated that the use of the island as a penal settlement has been a great handicap, but the author of the article lays most stress on the difficulties of communication, which leads to an accumulation of exports for which no cargo space can be found, and a consequent checking of output within the island. This difficulty of transport has of course been greatly increased during the war, and M. La Plagne considers that the best solution is the founding of a state line of ships to ply between Marseilles and Noumea, with its centre at the latter port.

As to the natural resources, the chief minerals at present exploited are nickel and chrome ores, both of which have been of special importance during the war. The difficulties of transport have led to the establishment of smelting-works in the island, of which some illustrations are given, but it is only the nickel ores which are so far treated, an electro-metallurgical installation for treating chrome ores, which was begun before the war, having been suspended during its progress. The other minerals, which include coal, petroleum, antimony, cobalt, gypsum, are practically not worked.

Further, the interior of the island is clothed in dense forest, which should in future supply both timber and paper pulp, but is not meantime utilised. The most important tree of the island commercially, as in the Pacific islands generally, is the coco-nut palm, but it suffers severely both from pests and from rats, and no co-ordinated effort has yet been made to combat these plagues. Rubber, formerly exported on a small scale, has now practically disappeared from the list of exports, owing to the destruction of the accessible plants. Coffee has suffered very severely from the devastations of Hemileia, and since the plantations mostly belonged to colonists with modest resources the replacement of the affected trees by resistant stocks has proved impossible in many cases, though such stocks have been planted extensively by others, and are said to promise well. Pearl shell is another natural resource of the island, but, in spite of protective laws, there seems danger of exhaustion of the supplies. An industry on which great hopes are based is that of preserved meat. New Caledonian tinned meats are said to have been bought extensively during the war for the use of the British armies.

Owing again, however, to the difficulties of transport the price of meat remains low in the island, which checks the development of the stock-raising industry. There is no tanning industry in the island, and hides are exported in the raw state. Cotton grows wild, and the hope is expressed that the colonists may find in the cultivation of this plant a means of making up for the losses incurred by the failure of the coffee plantations. Meantime, however, the export is very small. Rice is very largely imported for the use of the Asiatic population of the island, and this in spite of the fact that the plant grows well there, and that it would seem possible to increase production greatly.

The article makes clear that the colony suffers severely both from its remoteness from France and from other French territories, and has not as yet made the amount of progress which its natural wealth would lead one to expect.

General.

German Staff Maps of the Near East.—The Egyptian Survey Department at Cairo has presented to the Society 143 German and Turkish map sheets captured in the course of our Eastern Campaign. They are of considerable interest as showing what was probably all that the Germans and Turks possessed in the way of field surveys for military use. The first item of interest is a complete photolithographical Germanised reproduction of the 1-inch to 1-mile Palestine Exploration Fund Map. They have been unsuccessful with the reproduction, and the sheets are almost illegible, as the brown hills on the British map come out a black smudge. It is somewhat tragic that their staff map of Palestine was largely the work of Lord Kitchener! Later on they appear to have prepared a special new military map of Palestine and Syria on 1 : 50,000 scale, but, as some of the sheets are only dated July 1918, it would be too late for active service. Their reproductions of the Egyptian Surveys are more successful, and their large map of Mesopotamia, on a scale of 1 : 400,000, is an excellent production. Some of their large-scale maps of Asia Minor are evidently from original German and Turkish surveys, and will be valuable acquisitions for British use. Most of the maps appear to have been issued from the *Kartographische Abteilung des Stellvertretenden Generalstabes der Armee* at various dates from 1914 to 1918. Most of the Turkish maps are only printed in Arabic characters, although some of them have the German transliteration printed below.

The Influence of the Wind on the Distribution of Glaciers.—Mr. Fred. Enquist, in the course of his researches on the high mountains of Northern Scandinavia, has been much struck by the close connection visible between the position of the glaciers and permanent snow-fields and the direction of the prevailing winds, especially the winds of winter. His observations have led him to the conclusion—which indeed was to be expected—that glaciers and snow-fields form principally on the mountain slopes exposed to the snow-bearing winds. The point of interest in his paper (*Bulletin* of the Geological Institute of the University

of Upsala, xiv.), however, lies in the use he makes of the deduction. In the first place he shows that it may be utilised to determine the prevailing winds, especially of winter, in high mountain regions where direct wind observation has not been carried on, and where the difficulties of observation are great.

Further, the study of the distribution of the glaciers of the Ice Age as shown by the moraines, cirques, and so forth left behind, makes it possible to reconstruct the air circulation and thus the broad outlines of pressure distribution during the period. Work on these lines has led Mr. Enquist to the conclusion that at the period of maximum glaciation there was a well-marked high pressure area over the ice-fields of the northern hemisphere, owing to the chilling of the air by the ice. In consequence he believes that the present Icelandic low-pressure area did not then exist, but, on the other hand, an area of markedly low pressure occurred over the region now occupied by the Azores "High," the latter being displaced southwards, to the tropic. The Azores "Low" apparently extended over a part of North America, and encountered the present North Pacific winter low-pressure area, which was then much more pronounced, and extended over the part of the Rocky Mountains south of the American inland ice. Since the high pressures over the inland ice were permanent, summer and winter, the compensating "Lows" must also have been permanent, though they would be more marked in winter. Further, the steepness of the pressure gradients during the Ice Age must have meant a régime of stormy winds in the areas between the great centres of pressure, and these winds must have had a powerful influence on the orientation of the snowfields.

Wind Charts for Aviators.—A short article by MM. J. Rouch and L. Gain in the *Revue Générale des Sciences* for March 30th, summarises the need, from the standpoint of aerial navigation, for the publication of wind charts which, instead of showing surface winds only, should indicate the currents at various levels, as determined by balloon and kite observations. It is pointed out that navigation by sea gained greatly when Maury first began to issue charts of prevailing surface winds, for ships can save time by making detours to avoid strong contrary breezes. But the aviator may attain the same result by ascending to a level where the contrary wind is no longer felt, for it is by no means rare to find that surface winds have but a limited upward extension. As yet, of course, the material upon such vertical charts can be based is very limited in amount, but even so some interesting facts have been brought out. Thus over Paris it is found that westerly and south-westerly winds increase in frequency as one ascends into the upper air, easterly winds at the same time diminishing in frequency. A series of charts showing winds for the Eastern Mediterranean, at the surface, at 1000 m. and at 2000 m. brings out some curious points, showing for example that in establishing a regular service by air between Oran and Tunis, the pilot should travel at a height of about 2000 m., but that he should return from Tunis to Oran at an elevation of under 1000 m., if he wishes to take advantage of the prevailing winds.

Bournemouth Meeting of the British Association.—The eighty-seventh meeting of the British Association, under the presidency of the Hon. Sir Charles Parsons, opens at Bournemouth on Tuesday, September 9th. Sectional meetings will be held on Tuesday, Wednesday, Thursday and Friday, September 9th-12th, and, if necessary, on Saturday morning, September 13th. Prof. L. W. Lyde is to be president of Section E (Geography). Two evening discourses, apart from the president's inaugural address, are to be delivered, one by Sir Arthur Evans on "The Palace of Minos and the Prehistoric Civilisation of Crete," and one by Mr. Sidney S. Brown on "The Gyroscopic Compass."

The Lord Provost of Edinburgh, Sir J. Lorne Macleod, and Sir Alfred Ewing, Principal of the University, are to be present at the meeting to extend to the Association an invitation to hold its meeting in 1921 in Edinburgh.

Personal.—The Cullum Geographical Medal of the American Geographical Society for 1919 has been awarded to M. Emmanuel de Margarie, well known for his works on geographical geology, and for his translation of Suess' *Das Antlitz der Erde* into French. M. de Margarie has made a special study of the physical geography of the United States, and was a member of the American Geographical Society's transcontinental excursion in 1912.

NEW BOOKS.

EUROPE.

Les Frontières Historiques de la Serbie. Par Gaston Gravier. Introduction de Émile Haumont. Paris: Armand Colin, 1919. *Prix* 4 *fr.*

Bulgaria Self-revealed. Documents collected by Victor Kühne. With a Preface by Auguste Gauvain, and an Appendix by Z. D. Ferriman. London: Constable and Co., 1919. *Price* 4*s.* 6*d. net.*

Bulgaria. By C. Clenton Logio. Lecturer in Bulgarian, King's College, University of London. London: William Heinemann, 1919. *Price* 10*s. net.*

These three books have nothing in common save the fact that they all deal with aspects of Balkan problems. It is nevertheless convenient to consider them together, because not only do they supplement each other, but the last-named, at least, shows the ease with which a skilful advocate can arrange his facts in order to produce a particular impression, and thus emphasises the need of wide reading if sound judgments are to be reached in regard to the conditions which prevail in this still-vexed region.

M. Gaston Gravier's booklet has a pathetic significance, for it was written in 1913-14 as a thesis for the degree of Doctor of Letters at the Sorbonne, and was accepted in the latter year. But on August 2, 1914, its author was called up for military service, and, as has been already stated here, was killed while fighting in France in the summer of 1915. His paper has been issued by his friends as it was left by the author, without any changes or additions. The book has thus nothing whatever to do with the present war, and its author does not even consider in any detail the effects of the Balkan wars of 1912-13, holding that these were too near

the time of writing to be discussed fully. He practically confines himself to an account of the rise of Modern Serbia during the nineteenth century, supplemented by a description of the geography of the area, and of the effects on its evolution of the survivals of the earlier Serbia, as expressed both in the national traditions and in the administrative divisions retained under Turkish rule. His standpoint is wholly scientific and dispassionate, and his object is to show that historical events have been profoundly influenced by the geographical conditions, especially by the relief, notably the existence of the Morava-Vardar depression, which has tended inevitably to draw the inhabitants of the Shumadya region, the heart of Serbia, southwards towards the Ægean. In his final paragraphs he points out that the wars of 1912-13 all but satisfied Serbia's desires for expansion within the peninsula, but just because those wars gave her so much they left the Serbs with two unsatisfied longings—the one to supplement their gains by freeing their brethren under Austro-Hungarian rule to the north, and the other to complete that access to the sea which is essential for economic freedom. It does not appear, however, that M. Gravier anticipated that Austria, egged on by Germany, would, within a very short time of the completion of his work, stake all on an attempt to suppress free Serbia for ever—and at the same time fling the civilised world into the melting-pot.

M. Kuhne's book is presumably, though the statement is not made, a translation from the French. It consists of a series of extracts from Bulgarian, German, Austrian, and other journals, connected by a thread of narrative, and brings the story down to the early part of the year 1917 only. Mr. Logio's book, on the other hand, was written immediately after Bulgaria's capitulation, but before the Armistice. Briefly it may be described as the *apologia* of the Bulgarian people, and its method is frankly propagandist. Put bluntly, it may be said that, if Mr. Logio interprets the Bulgarians aright, they had decided when he wrote to fling over their former allies, the Central Powers, in favour of the Entente, and to claim on this account that they should have generous treatment, and obtain as an act of friendship all, or almost all, that they had previously striven to gain on the field of battle. M. Kuhne's quotations suggest that this attitude is probable enough, in view of the general "realist" nature of Bulgarian policy during the war.

That even Bulgaria's allies were under no illusions in regard to the policy of that country is shown, among many other quotations, by the following. In September 1916 Count Tisza's organ said, "Bulgaria has been crafty. . . . Bulgarian diplomacy may thus boast of its duplicity. For we must not judge diplomacy by its acts, but by the results which ensue; success has justified these tactics of the Bulgarian Minister of Foreign Affairs." In January 1917 the correspondent of the *Vossische Zeitung* at Sofia sent a letter to that journal which contained the following passage: "During recent years, and on the eve of the present war, Bulgarian statesmen have taken several occasions to declare that Bulgaria, with her ardent patriotism, is susceptible to no sentiment, and that she pursues only a realistic policy. A great Bulgarian politician, comparing Vienna and Petrograd, expressed himself thus, 'For us, the good aunt is the one who gives us the largest cake.' This truth has not been modified in any way since. After the war it will be seen more clearly that Bulgaria is only made for practical politics, and does not shackle herself with sentimentality."

Mr. Logio attempts to show that Bulgarian policy during the war was solely guided by the Court party, and that the "people" were always opposed to it. It is interesting therefore to note that the *Preporetz*, the organ of the Democratic party, and an Opposition journal, on April 24, 1917, stated with great simplicity

that "all means are justified, provided that we are not beaten." Gueshoff, of whose "moderation and statesmanship," and "extreme respect for constitutional methods," Mr. Logio speaks favourably, said in February 1916 to the correspondent of the *Vossische Zeitung* that his party "supported Russia solely because it believed in Russian power; but the opinion of Radoslavoff having shown itself to be more sound, it only remains to Bulgarian politicians to bow before existing conditions." Times have, however, changed since the *Mir*, Mr. Gueshoff's organ, spoke of "the most civilised and disciplined people in the world, the German nation," and the *Vremni Izvestia* saw "in the German nation a great teacher, and in the German spirit the greatest treasury of virtues," and Mr. Logio tells us now that "it may be stated without exaggeration that the vast majority of the Bulgarian people never approved of the pro-German policy which was foisted on them by their rulers"; in Mr. Gueshoff's words, they may be said to have supported this policy because they believed in German power, and when events failed to justify their belief, they promptly "bowed before existing conditions." Even Mr. Logio, however, does not attempt to conceal the corruption of Bulgarian political life, and his account of how elections are "made" in that country by the party in power may be recommended to the notice of those who see in "democracy" and the ballot box the cure of all the world's ills.

Mr. Logio's book contains a chapter on "Economic Conditions," which seems intended to prove that if this country would consent to act the part of the "good aunt," and give Bulgaria the large cake which she still wants, our own trade and industries might gain considerably thereby. There is also a chapter on Macedonia which should be read in connection with the writings of other authors on the same subject, while a considerable amount of space is devoted to various Greek claims, which the author supports warmly. Of Serbia, not unnaturally, little is said—of her sufferings at the hands of the Bulgarians practically nothing; but we are invited to sympathise with Bulgaria's losses during the war.

Russia's Ruin. By E. H. Wilcox. London: Chapman and Hall, 1919. *Price* 15*s. net.*

The author states that he was in Berlin in 1914 immediately before the outbreak of the war, and that every one there considered that Russia was then on the verge of revolution. The Revolution did not actually occur till 1917. He considers that Germany's knowledge of Russia was always more intimate than ours, as "Germans made a very thorough study of Russian. So much so, that Russians were in the habit of saying that, even not excluding themselves, the only people who used their language, with a complete mastery of its grammatical refinements, were Germans." He adds that the strongest force in producing the Russian Revolutions of 1905 and 1917 was "the land-hunger of the peasantry, who are more than eighty per cent. of the population." "Another factor in keeping alive popular discontent was the personality of the Tsar. We now know that Nicholas II. was, perhaps, the least fitted of all men to deal with the heavy heritage left him by his father." He was "an amiable nonentity, completely wrapped up in the paltry details of his family life." The author, who was the Russian correspondent of the *Daily Telegraph*, gives an elaborate account of the agencies which led Russia on its "road to ruin."

As Lenin is now the high priest of Bolshevism, it is interesting to read the author's chapter on "Lenin's Political Genesis." In 1887 Lenin's brother was hanged for attempting to kill the Tsar Alexander III., father of Nicholas II. Like his executed brother, Lenin became a member of the Terrorist group, and was banished to Siberia. He appeared in London in 1903 at a Conference of

Russian Social Democrats, and, as he was supported by the majority of those present, his wing of the party was henceforth known as "Bolsheviki" (signifying "the majority"), the minority being called "Mensheviki." Lenin returned to Russia for the Revolution of 1905, and controlled the Bolshevik Press in St. Petersburg. In 1907 he fled abroad, and in 1912 was prominent at a conference in Prague, when all Social Democrats were ostracised who confined themselves to purely "legal" methods of propaganda. He then went to Switzerland, and in 1917 was paid by the German Government to go to Russia to fan the flames of the revolution there, and thus corrupt the Russian army. This is another of the inexpiable crimes of the Government of Wilhelm II. Since then Lenin's career is well known, how he gradually acquired complete power over Russia, and steeped it in the blood of every one who opposed him, so that his "Reign of Terror" exceeds even that of his infamous forerunner Robespierre.

With regard to the personal appearance of Lenin, the author says, "Neither his physical nor his mental equipment is of a sort to appeal to the crowd. He is a little man of common-place figure, with no other outward mark of distinction than the high, bald dome of his forehead. His gesture, as he speaks, is casual and spasmodic. His speech is swift and fluent, simple in its form, and free from ornament, but crowded with facts. To the masses, he is what the Tsar once was —the source of all power and authority. In Russian eyes, every big movement must be incorporated in a single man, and to them Lenin is the embodiment of Bolshevism." However, "no Tsar of modern times ruled so autocratically as Lenin, and none was more ruthless. The Tsars restricted freedom of speech—Lenin has absolutely abolished it. The Tsars suppressed this or that newspaper —Lenin allows none which opposes his views. The Tsars put people to death for offences which existed only in Russia—Lenin has massacred thousands against whom no charge at all was brought."

ASIA.

A Broken Journey: Wanderings from the Hoang-Ho to the Island of Saghalien and the Upper Reaches of the Amur River. By MARY GAUNT. London: A. Werner Laurie, Ltd. *Price* 18*s. net.*

Readers of Mrs. Gaunt's previous book of travel in North China ("A Woman in China," vide *Scottish Geographical Magazine*, vol. xxi. p. 217), will turn to this, her latest book, with feelings of pleased anticipation; and they will not be disappointed, for there is not a dull page in it from start to finish. One does not know which to admire most, Mrs. Gaunt's powers of description, or the courage and perseverance which carried her through a very trying journey in western Shan Si, amidst conditions which have to be seen in order to be appreciated, with no companion save the little Pekinese dog which she calls James Buchanan, a very important member of the party. The reviewer is grateful to find in Mrs. Gaunt's company an oasis in the sometimes sandy desert of many travel books.

It was at Pao Ting Fu that Mrs. Gaunt planned a journey across Asia, not by the trans-Siberian railway, which was traversed by thousands every year before the war, but by the old caravan route across China and Chinese Turkestan to Andijan, the eastern terminus of the Caspian Railway. Missionary and other friends did their best to dissuade her from attempting this journey. As one of the missionary ladies in Pao Ting Fu put it—"If I wanted to die, I would choose some easier way"; and it was, perhaps, as well for Mrs. Gaunt that the unrest in Shen Si in the spring of 1914, when the bandit Pai Lang (*White Wolf*) was on the war-path, prevented her from getting farther west than the banks of the Hoang

Ho, at a point near Fên Chou Fu, where it forms the frontier line between the provinces of Shan Si and Shen Si. Here the reports were so threatening that she abandoned her projected journey, and turned back in her tracks. Hence *the Broken Journey*, which was afterwards prolonged on the Amur River, and by a flying visit to Saghalien. The final chapters are made up of an interesting account of the author's homeward journey by a Russian troop-train across Siberia to Petrograd, while mobilisation was in progress, and thence by Finland, Sweden, and Norway to England.

Mrs. Gaunt's travel pictures are both bright and amusing, even when conditions were very grim for the lonely pilgrim. Though an avowed "Greek" in matters of religious belief, she is sympathetic with the missionaries in the interior of China, who endure danger and hardship gladly, and labour to bring something of light and healing into darkened homes. These were always ready to give shelter and kindly care to the traveller, and she gives her impressions of the various mission stations: the American, which, being well endowed with money for schools and hospitals, attracted many converts; and the China Inland and Scandinavian faith-missions, which, being less richly provided, achieved smaller results. Mrs. Gaunt was much impressed by what she saw of the awful results of foot-binding on the health and physique of the women of Shan Si Province, where it is almost universally practised, even among the poorest of the poor.

The author's photographs are good, as will be realised by those who saw the slides which illustrated Mrs. Gaunt's lecture to the Society. Unfortunately those taken on the Amur were annexed by the Russians, and lost. A sketch-map of the ground covered would have been a useful addition to the volume.

AMERICA.

The Development of the United States from Colonies to a World Power. By Max Farrand, Professor of History in Yale University. With a Preface by Viscount Bryce. London and Edinburgh: T. C. and E. C. Jack, Ltd., 1919.

The keynote of this book is well expressed in a sentence by M. Émile Boutmy: "En un mot, les États-Unis sont avant tout une société économique; ils ne sont qu'à titre secondaire une société historique et politique." Their political events are sometimes dramatic and spectacular, but they do no more than signalise tendencies upon the development of which they had comparatively little influence. Professor Farrand has set himself to trace those tendencies back to their causes, and to follow them out to their results in the United States of to-day. In so doing he has produced a book which is recognised as being of a new type among histories of the United States. He frankly recognises that the story he has to tell is one of industrial development, and that the politics of the drama are the outcome of industrial conditions from beginning to end. And since industrial conditions are fundamentally dependent upon geographical conditions as limiting factors, the story becomes one in which the geographer is interested no less than the historian. This holds good, more or less, of the history of any country, but in the case of the United States the whole of the facts are available from the date of its first occupation by civilised man, and we see compressed into some four centuries the growth of half a continent from primitive conditions to the highest state of modern organisation. The purely geographical factors, such as the influence of the Mohawk Valley and the great waterway of the Mississippi, are fully recognised, and their influences upon social and political events are made clear.

In the more purely political discussions Professor Farrand's attitude is beyond

reproach. He aims at absolute impartiality, as between the United States and Great Britain, and if the story must be told from the standpoint of the former it could hardly exhibit a more fair and even friendly tone.

The appearance of such a history at the present juncture is peculiarly opportune, and it will be welcomed by all who have at heart the new *entente* between the two great English-speaking Powers. The more complete our knowledge is of a land which we have greatly misunderstood, being ourselves not less misunderstood in our turn, the more sure and lasting will be our friendship and co-operation.

The perusal of this book, as of other books on the United States, leaves one craving behind—the craving for a new adjective to express "of or from, or belonging to the United States." The ambiguous makeshift word "American" becomes irritating; in places where "Americans" and "Canadians" are mentioned together this is peculiarly the case. There does seem to be room for a word which will indicate a nation rather than a continent—or two, if we take North and South America as distinct continents.

Jack London and Hawaii. By CHARMIAN KITTREDGE LONDON. London: Mills and Boon, 1918. *Price* 8*s.* 6*d. net.*

The late Jack London and his wife spent some months in the Sandwich Islands in 1907, during the voyage of the *Snark*, and returned there in 1915, where they stayed for more than a year. The present book is at once a journal of experiences, kept by Mrs. Jack London, and a memorial of her husband. It gives interesting pictures of island life and scenery, and is illustrated by a number of photographs. The author's style, especially the excessive use of adjectives, will not please every one, but she succeeds in giving a wonderful general impression of the beauties of the vegetation.

The following account of an incident in Honolulu seems to throw some light upon racial problems in the United States. Mrs. London describes the mixture of races in Honolulu—"the population of far-drifted nationalities that shelters in its sweetly hospitable confines"; and goes on to say that in walking along a narrow lane "suddenly I found myself confronted by a bristle-headed, impudent-eyed Japanese coolie who had stepped out from a doorway . . . it would have been only seconds when I should have come up to him, and, for one of those seconds, it looked as though he were not going to give room. Without consciously reasoning I knew that I, a white woman, should rather have died than step around this coolie Asiatic. . . . I felt as if the Jap's last-instant side-step into his doorway had saved me from an exhibition of the boxing tactics Jack has taught me. Even then I came within a wise ace of slapping the insolent grin my furious side-glance did not miss." The anecdote is introduced by the phrases: "Do not confuse this with race *hatred.* My respect and admiration for Japan are profound. It is a different thing altogether."

The Development of the British West Indies, 1700-1763. By FRANK WESLEY PITMAN, Ph.D. Yale Historical Publications: Studies, Vol. IV. Demy 8vo. Pp. xiv + 495. New Haven: Yale University Press. London: Humphrey Milford, 1917. *Price* $2.50 *net.*

The first half of the eighteenth century was a critical period in the history and development of our sea-borne commerce. We were experimenting with the foundations of a colonial empire; so were the French; both of us realised, dimly or

clearly, the immediate and future value of dependencies beyond Europe. The factors governing their establishment were only partially understood ; difficulties of many kinds cropped up. In particular, some kind of policy in regard to trade relations between these new sources of wealth and the home country had to be devised. A dictatorial and short-sighted policy proved ineffective, and had gradually to give place to one much more broad-minded and ameliorative, with valuable results both to the Colonies and to the British Isles.

The British West Indies, acquired between 1623 and 1803, represent 119,738 square miles of territory. In their acquisition religious motives, resulting in patriotism to the new colony and social reform, as was often the case with colonies in our New England States, played no part ; the motives were strictly utilitarian and materialistic, involving conceptions of life and government prevalent in Britain in the eighteenth century, and the negation of social progress. Society in the British West Indies in that century was dominated by the absentee capitalist class, who, with their slaves, monopolised the land and industries, so that the poor whites became idle and degenerate. Labour questions became acute. Deficiency Acts aimed at populating the islands with whites for the plantations ; jail birds from England were sent out and proved too expensive. Agriculture, trade, and handicrafts were carried on by slaves, who could endure the climatic conditions. Sugar cultivation and associated industries demanded a large amount of labour, and Indian slaves not being adapted to the work, British sugar planters had recourse to African negroes, who rapidly learned the various processes connected with preparing the soil, planting, weeding, and cutting canes. In the more highly skilled operations such slaves worked under the guidance of white overseers. Sugar-growing became a profitable business, and the colonies flourished. The emancipation of slaves almost ruined the sugar industry in the islands, but the development of the beet-sugar industry opened up new sources of supply. During the first half of the century small cultivators had a hard struggle, but were saved from total extinction by (as in Jamaica) the introduction of inexpensive coffee cultivation.

Till the middle of the eighteenth century raw sugar was mainly exported, but after that refined sugar took first place. For English sugars the principal customers were Flanders, Holland, Baltic ports, Germany, and Ireland. The trade was hampered by the vexatious restrictions imposed by the English Government, and the planters agitated for direct trade between the colonies and Europe, where sugar was very necessary owing to the extensive consumption of tea and coffee. Excessive duties on English sugars allowed French, Dutch, and Portuguese sugars to capture the European markets. The agitation culminated in the Act of 1739, which allowed shipment of sugar direct from the plantations to any foreign ports in Europe so long as British built and owned ships were used. In 1742 British colonial ships were allowed the same privilege, which proved that the planters had some influence in home politics.

Profitable time can be spent in studying Dr. Pitman's two chapters on the complexities of international trade in the first three decades of the eighteenth century. Planters tried to safeguard their interests by means of local protective Acts, and in 1733 the Government gave imperial protection to the sugar industry by the Molasses Act, which "prohibited the importation of foreign sugar, molasses, or rum into Great Britain, Ireland, or any British Dominion, and also forbade the exportation of horses or lumber to any foreign sugar colony." Adequate administrative machinery was not set up to enforce the Act, and much illicit commerce prevailed with anything but happy results to the colonies. In 1760 the suppression of this trade, which had been very rife during our war with France, "was

based on military necessity rather than in response to the desires of the sugar planters."

Dr. Pitman's volume deserves close study. It is full of information gathered from many sources, and is well supplied with graphs and statistical tables. A map, a copious index, and valuable appendices complete the book.

EDUCATIONAL.

Geography in Education. By Members of the Geographical Association. London: George Philip and Son, Ltd., 1919.

Geographical Exercise Books. Part VII: Physical Geography. By B. C. Wallis, B.Sc. *Price* 1*s.* 6*d.*

Contouring and Map-reading. By B. C. Wallis, B.Sc. London: Macmillan and Co., Ltd., 1918.

In these three little books the needs of the geographical teacher especially in intermediate and secondary schools are catered for, both from the theoretical and the practical points of view. The first of them consists of a series of articles which embodies the results of discussions which took place during the Summer School in Geography held at the University College of Wales, Aberystwyth. In these articles the teacher of geography will find guidance in drawing up schemes of instruction suitable for pupils at various ages, but especially for pupils between the ages of twelve and sixteen. Other papers deal with the co-ordination of geography with the other subjects of the school course, while the whole report emphasises the importance of geographical teaching in modern education, and points to the necessity for an increase in the number of teachers specially trained in this subject. The other two books are Messrs. Macmillan's latest additions to their valuable series of geographical exercise books, and will be welcomed by the teacher as practical aids in the working out of his geographical schemes of study. The exercises in physical geography are varied and well chosen, and the working out of them will give the pupil a real grasp of the subjects dealt with by the modern geography teacher. The exercises in contours and map-reading are excellent, and should be in the hands of every teacher. A pupil who has worked through this book should have no further difficulties with map-reading, and should be able to visualise any area with photographic clearness.

BOOKS RECEIVED.

The British Isles. By Leonard Brooks, M.A., F.R.G.S. With Diagrams and Maps. Crown 8vo. Pp. 156. London: Hodder and Stoughton, 1919. *Price* 2*s.* 6*d.*

Houseboat Days in China. By J. O. P. Bland. Illustrated by W. D. Straight. Crown 8vo. Pp. 289. London: Wm. Heinemann, 1919. *Price* 7*s.* 6*d. net.*

Histoire des États-Unis de 1787 *à* 1917. Par Georges Weill. Royal small 8vo. Pp. 215. Paris: Librairie Felix Alcan, 1919. *Prix* 5 *frs.*

The New Europe: A Weekly Review of Foreign Politics. Vol. x. 16th January 1919 to 10th April 1919. Medium 8vo. Pp. 324. London: Eyre and Spottiswoode, 1919. *Price* 10*s.* 6*d. net.*

Belgium under the German Occupation: A Personal Narrative. By Brand Whitlock, U.S. Minister in Belgium. 2 vols. Demy 8vo. Pp. Vol. I. 490; Vol. II. 478. London: Wm. Heinemann, 1919. *Price* 25*s. net.*

Unconducted Wanderers. By ROSITA FORBES. With 72 Illustrations. Demy 8vo. Pp. 198. London: John Lane, 1919. *Price* 12*s.* 6*d. net.*

China of the Chinese. By E. T. C. WERNER, H.B.M. Consul, Foochow (retired). Crown 8vo. Pp. xii + 309. London: Sir Isaac Pitman and Sons, Ltd., 1919. *Price* 9*s.*

The Voyage of a Vice-Chancellor. By A. E. S. Crown 8vo. Pp. ix + 139. Cambridge: University Press, 1919. *Price* 6*s. net.*

The East of Arran: A Guide-Book for the Young of all Ages. With Stories, Illustrations, and a Map. By A. BOYD SCOTT, M.C., B.D. Illustrated by DAVID H. RUDD. Crown 8vo. Pp. 240. Paisley: Alexander Gardner, 1919. *Price* 3*s.* 6*d. net.*

Official Year-Book of the Commonwealth of Australia, 1901-1916. By G. H. KNIBBS. Melbourne, 1917.

Annual Report on Papua, 1917-18. Melbourne, 1917.

Colonial Reports (Annual).—Gambia (979); Gibraltar (981); Bermuda (982); Mauritius (985); Barbados (989); Sierra Leone (990); Straits Settlements (991); Leeward Islands (992); Uganda (993).

Jaarverslag van den Topographischen Dienst in Nederlandsch-Indie over 1917. Batavia, 1918.

Agricultural Statistics, 1917. Vol. VI., Part I.: Acreage and Live-Stock Returns of Scotland. Edinburgh, 1919.

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

NEW MAPS.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st October to 31st December 1918:—

One-inch Map. Black Outline Edition. Price 1s. each. Sheets 14, 18, 19, 21, 27, 36, 37, (42 and 50), 43, 44, 45, 46, 47, 64, 103, 104, 105, 106, 107, 108, 109, 110, 113.

Six-inch and larger Scale Maps. Six-inch Maps (revised). Quarter sheets with contours in red. Price 1s. 6d. each. *Lanarkshire.*—5 NE., SE.; 6 SE., SW.; 10 NE., NW.; 11 NW.; 12 SW. *Renfrewshire.*—8 SE.; 11 NE., SW.; 12 NW., SW., SE.; 14 NE.; 15 NW.; 16 NW., NE.; 17 NW.; 19 SW.

1 : 2500 Scale Maps (revised), with houses stippled and with areas. Price 5s. each. **Dumbartonshire.*—Sheets **N 11**—16; **N 13**—2; **N 14**—4, 5, 7, 8, 10, 13, 14; **N 15**—6, 9, 13; **N 17**—1; **N 22**—3, 8; **N 23**—5, 14. **Dumbartonshire* (Det.).—Sheets **N 33**—5, 11, 12. *Fife and Kinross.*—Sheets **4**—1; **6**—8, 11, 12; **7**—3, 5, 6, 9, 10; **20**—8, 15, 16; **21**—1, 2, 4, 5, 8; **22**—1, 2; **26**—16; **27**—9, 10, 11; **28**—3, 4, 8, 11, 14, 15; **33**—3, 7; **34**—4, 7, 8, 11, 12, 15; **35**—1, 8, 12; **36**—5, 9; **37**—11, 12; **38**—5, 6, 9, 10, 11, 12; **40**—8, 10, 11; **43**—1, 6. **Linlithgowshire.*—Sheets **N 1**—13; **N 3**—14; **N 4**—(3 and 4), 11, 14, 15; **N 7**—5, 9, 14, 16; **N 8**—10; **N 10**—3, 12, 16; **N 11**—6 (8, 12, and 5), 10, 11. **Stirlingshire.*—Sheets **N 8**—16; **N 9**—15; **N 13**—2, 6, 12, 16; **N 18**—13; **N 19**—4; **N 20**—6, 9, 13; **N 21**—4; **N 24**—3, 13, 14, 15, 16; **N 25**—9, 13; **N 30**—2, 3, 4; **N 31**—13, 14; **N 36**—5. Price 3s. each. **Dumbartonshire.*—Sheet **N 25**—3.

*Revised on new meridian, the plan numerals therefore differ from those of the previous Revision.

Note.—There are no coloured editions of these Sheets, and the unrevised impressions have been withdrawn from sale.

Special enlargements from 1 : 2500 to 1 : 1250 Scale. Prepared for the Land Valuation Department, Inland Revenue. Price 5s. each. *Fifeshire.*—Sheets **34**—7 SE. ; 8 SW. ; 11 NE., SE. ; 12 NW., SW. ; 15 NE.

The following publications were issued from 1st to 31st January 1919 :—

One-inch Map. Black Outline Edition. Price 1s. each. Sheet **17.**

Six-inch and larger Scale Maps. 1 : 2500 Scale Maps (revised), with houses stippled and with areas. Price 5s. each. *Argyllshire.*—Sheet **193**—(10 and 6). *Buteshire.*—Sheets **193**—(10 and 6), 11, 15 ; **194**—9, 10, 14 ; **203**—3, 12 (16 and 15) ; **204**—3, 5, 11, 13 ; **214**—(3 and 7), 4 ; **225**—15 ; **226**—9 ; **237**—2, 14 ; **238**—8 ; **244**—4 ; **248**—4, 7, 8. **Dumbartonshire.*—Sheets **N 12**—16 ; **N 13**—13 ; **N 14**—9 ; **N 16**—7, 8 ; **N 17**—2, 3 ; **N 18**—2, 9. **Dumbartonshire* (Det.).—Sheet **N 29**—9. **Stirlingshire.*—Sheets **N 13**—7 ; **N 29**—9.

Note.—There are no coloured editions of these Sheets, and the unrevised impressions have been withdrawn from sale.

The following publications were issued from 1st to 28th February 1919 :—

Six-inch and larger Scale Maps. 1 : 2500 Scale Maps (revised), with houses stippled and with areas. Price 5s. each. *Argyllshire.*—Sheet **194**—5. *Buteshire.*—Sheets **193**—16 ; **194**—5 ; **203**—4, 8 ; **204**—1, 2, 7, 9, 10, 14, 15 ; **237**—6 ; **243**—6, 14 ; **244**—11, 12 ; **248**—3 ; **249**—1. **Dumbartonshire.*—Sheets **N 13**—14 ; **N 22**—2 ; **N 23**—15. **Dumbartonshire* (Det.).—Sheet **N 34**—5. **Stirlingshire.*—Sheet **N 13**—11.

Note.—There are no coloured editions of these Sheets, and the unrevised impressions have been withdrawn from sale.

*Revised on new meridian, the plan numerals therefore differ from those of the previous Revision.

ADMIRALTY CHARTS OF SCOTLAND.—New editions.

The North Sea, Central Sheet.—From the latest British and Foreign Surveys. 1919. No. 2182 b. Price 5s.

Plans in the Firth of Forth.—Granton Harbour, Leith Docks, Grangemouth Docks. 1919. No. 3724. Price 2s.

River Forth, Fisherrow to Port Edgar. 1919. No. 114 b. Price 3s.

Admiralty Office, London.

ADMIRALTY DIAGRAM OF TIDES AT DOVER.—This set of Diagrams shows the state of the Tides at Dover for any hour during the year 1919. Price 6d.

ADMIRALTY CHART OF MINED AREAS IN BRITISH SEAS.—Showing the Mined Areas and Safe Channels in Waters surrounding the British Islands. 1919. Price 2s. *Admiralty Office, London.*

BARTHOLOMEW'S TOURING ATLAS OF THE BRITISH ISLES.—Fifth Edition, 1919. Containing 120 pages of maps on uniform scale of 10 miles to an inch. Orographical colouring. Price 2s. 6d. net.

John Bartholomew and Co., Edinburgh.

ENGLAND AND WALES, MOSQUITOES.—Map showing Distribution of Anopheline Mosquitoes, with Text and Notes. By W. Dickson Lang, M.A., Assistant in Department of Entomology. 1918. Price 2s. 6d.

British Museum of Natural History, London.

ITALY.—Carta d' Italia del Touring Club Italiano. In 59 Fogli. Alla Scala di 1 : 250,000. Pubblicazione diretta da L. V. Bertarelli. Prezzo : Per i Soci del T. C., L. 0.50 ; per i non Non Soci, L. 1. Foglio 4, Bergamo ; Foglio 5, Trento ; Foglio 6, Belluno. *Touring Club Italiano, Milano.*

These sheets are excellent specimens of the New Motoring Map of Italy, on quarter-inch to mile scale, now being published by the Italian Touring Club. The hills are shown by hachures printed in brown. The motoring roads are coloured according to gradients. Each sheet is accompanied by a complete index of places which gives their location and height in metres.

ROUMANIA THROUGH THE AGES.—An Historical, Political, and Ethnographical Atlas by Dr. Comnène. 1919. Price 10 frs.

Librairie : Payot and Co., Paris.

This atlas presents the case for a new Roumania based on historical and ethnographical claims. It is a strong case ably set forth in a telling and graphic form.

AMERICA.

MANITOBA, SASKATCHEWAN, AND ALBERTA.—Map showing Land Registration and Judicial Districts. Prepared in the Natural Resources Intelligence Branch under the direction of F. C. C. Lynch. Scale 35 miles to an inch. Second Edition, 1919. *Department of the Interior, Ottawa.*

MOUNTAINS OF WESTERN CANADA.—Map to illustrate the Nomenclature as approved by the Geographic Board of Canada, 1918.

Department of the Interior, Ottawa.

BAFFIN BAY AND DAVIS STRAIT.—Monthly Meteorological Charts for 1916, with Text. Published by the authority of the Meteorological Committee. Scale 1 : 5,000,000. Price 8s. net. *Meteorological Office, London.*

PERU.

Plano de la ciudad del Cuzco. Escala 1 : 5,000.
Plano del rio Huallaga. Escala 1 : 500,000.
Plano del rio Tambopata. Escala 1 : 500,000.
Mapa historico y geografico de Paucartambo. Escala 1 : 200,000.
Plano del rio Pastaza. Escala 1 : 500,000.
Plano del rio Manu. Escala 1 : 60,000.
Corte geologico de las immediaciones de Morococha.
Plano de los rios Napo y Putumayo. Escala 1 : 1,000,000.
Croquis general de los Rios Estudiados por la comision exploradors de Istmo Fitzcarral.
Mapa de la navegacion al Alto Marañon. Escala 1 : 250,000.
Croquis del Alto Ucayali y Bajo Urubamba. Escala 1 : 500,000.

[*Presented by the Geographical Society of Lima.*

These maps form another important contribution to cartography from the enterprising Geographical Society of Lima.

AFRICA.

CENTRAL AND SOUTH AFRICA.—By J. G. Bartholomew, LL.D. Scale 1 : 5,000,000. With inset Town Plans. New and revised edition, 1919. Price, mounted on cloth, 4s. net. *John Bartholomew and Co., Edinburgh.*

Shows new political colouring revised to date.

CENTRAL AND SOUTH AFRICA.—Railway and Political Map, 1919. Scale 1 : 4,650,000. Published by authority at the office of *South Africa*.

Office of "South Africa," London.

This is essentially a railway map, and appears to show all the railway stations in Central and South Africa.

AUSTRALASIA.

OROGRAPHICAL MAP OF AUSTRALIA.—Base Map reproduced from the map compiled, drawn, and printed from the Commonwealth Government, at the Department of Lands, Sydney, N.S.W., from data supplied by the several States, and published by the authority of the Honourable the Minister of State for Home and Territories, 1918.

Scale 1 : 5,000,000. *Commonwealth Government Office.*

The orographical data have been compiled at the Commonwealth Meteorological Bureau, and the map shows contours at intervals of 500, 1000, 2000, 3000, 4000, and 5000 feet.

This is the first official orographical map of Australia, and the data are obviously still very imperfect, but we hope the map will soon be improved upon.

NORTH-WEST COAST OF AUSTRALIA.—Prepared to accompany a Narrative of an Expedition of Exploration by Dr. Herbert Basedon, 1916. With inset Geological Sketch-map. Scale 1 : 950,000.

Royal Geographical Society of Australasia, Melbourne.

NEW ZEALAND.—Reduced Survey Map by J. G. Bartholomew, LL.D., F.R.G.S. Coloured to show height of land. Scale 33 miles to an inch. With inset maps of Wellington, Christchurch, Dunedin, and Auckland. 1918. Price, mounted on cloth, 2s. 6d. net.

John Bartholomew and Co., Edinburgh.

This is the first contoured Touring Map of New Zealand yet published.

GENERAL.

TIME ZONE CHART OF THE WORLD.—Showing Time now in use in various Countries. 1919. Price 1s. *Admiralty Office, London.*

This chart illustrates the system of Time Zones for time-keeping at sea now in force by the Navies of Great Britain, France, and Italy.

NUOVO ATLANTE DI GEOGRAFIA FISICA, POLITICA ET ECONOMICA.—Fascicolo 1. Geografia generale—Europa ed Italia in generale—Spagna, Portogallo, Francia, Gran Bretagna e Irlanda. 18 tavole con oltre 300 carte, cartine e diagrammi. Da Assunto Mori, Professore nel Regio Istituto Tecnico di Roma.

Ditta G. B. Paravia e C., Torino.

This is the first part of a new advanced educational atlas which promises to be among the finest works of the kind. It has taken advantage of the best features of the atlases which have preceded it, and in most cases improved upon them. We congratulate the editor on his work, and look forward to the completion of the atlas.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

BEGINNINGS OF A SURVEY OF EDINBURGH.

By Prof. P. GEDDES, Outlook Tower.

(With Illustrations.)

THE survey of our city and its region is of fundamental importance alike in the understanding of their past and present, and towards the preparation of the Greater Edinburgh of the near future.

Such a survey has long been in progress, and with stimulus to its workers in Edinburgh, and to wider initiatives beyond, *e.g.* as nucleus of the long itinerant Cities and Town Planning Exhibition, the Regional Association, etc. Beyond the interpretation of the conditions of the city of the present we seek to connect our studies of contemporary conditions with their origins—local, regional, and general. This inquiry requires, first, a survey of our geographical environment in its fullest and deepest aspects: secondly, a survey also of the history of the city and region, and of Scotland in particular; with general history so far as bearing on this, and necessarily, therefore, from the earliest beginnings of civilisation. We are thus learning to view history not as mere archæology, not as mere annals, but as the study of social filiation. That is, the determination of the present by the past; and the tracing of this process in the phases of transformation, progressive or degenerative, which our city has exhibited throughout its various periods—Ancient, Mediæval, Renaissance, and Industrial—with each of these in its earlier and its later developments. We seek thus to interpret our observation of the present, and even to discern something of the opening future; for that also is already incipient, as next season's buds are already here.

Such a detailed and comprehensive survey of a city is necessarily difficult and laborious, though not insuperably so; and it is therefore not surprising that there are students and workers in education and in

the housing and town-planning movements who hesitate to undertake or even encourage such surveys, lest good and urgent work be delayed. Let us here waive this controversy; and with the series of maps before us run over some of the main phases of the development of Edinburgh.

Recall in outline the general topography of old Edinburgh—a great volcanic rock—the surviving lava-plug of a crater worn away by the Ice Age, and with a long ridge or "tail" running downhill eastwards from the "crag" to low ground at the foot of Salisbury Crags and Arthur's Seat. Thus, from the fairly lofty Outlook Tower, almost at the apex of the ridge, we can command a view at once of the rock and its huge castle to the westward, and of the old city running down the ridge to the east. The seaport of Leith is on the coast to northward, and the New Town lies between; while nearer still, betwixt us and the varied façades of Princes Street, lies the valley of the old "Nor' Loch," intersected longitudinally by the railway, and transversely by the earthen Mound with its Art Galleries, and further east by the North Bridge, under which lies the vast station into which the railway line expands. Southward the city also extends for a couple of miles along each of the main roads to the south and south-west; so that the historic Castle and Old Town remain as a central head and backbone of the irregularly spread modern growth. Thus, while people still think and speak of Edinburgh mainly in terms of its Mediæval and Renaissance "Old Town," and its eighteenth-century "New Town," the modern Edinburgh and Leith extend far around these in all directions, and include a population which is now nearly approaching half a million, which seems destined to considerable further expansion, and which is thus in need of fuller consideration, economic, hygienic, and civic, than it has yet received.

From the very outset of our survey of a city, we must observe and understand it in its region. The Tower overlooks the city in both its immediate and its greater landscape. The first of these ranges from the Pentland Hills to the Firth of Forth, and shows the city fringed at each level with the appropriate rustic life, from the sportsman's solitudes and pastoral hamlets of the Pentland slopes, as notably R. L. Stevenson's Swanston, through the agricultural and the mining villages of the Lothian plain to the characteristic fishing ones along the coast. Thus the real country is accessible on every hand, and its villages are not yet the mere suburban dormitories into which those around London and other great cities have so largely become transformed. Yet this landscape is but a fraction of the larger visible whole. To north and east we have the widening estuary of the Firth of Forth, with Fife and its towns upon the opposite shore. Westward, the Forth Bridge is seen overleaping the mile of the old Queen's Ferry: beyond this lies the old yet renewing city of Dunfermline, extended to include Rosyth. The spacious anchorage of the Upper Forth has also its mercantile ports. Finally, far beyond Stirling, the great Highland hills rise against the sunset. Thus one readily realises the situation of Edinburgh as making it a convenient metropolis not only for its region but for Scotland itself.

Yet we cannot trace our Capital city from its early beginnings upon the castle rock without understanding it as a local hill-fort associated with seaport and agricultural plain; and as arising after the departure of the Romans, as a defence against the incursions of the Northmen. Indeed to understand a city of this type we must go further afield than ever. Hence the real comparison of Edinburgh and Athens—each plainly a hill-fort associated at once with a seaport and with an agricultural plain. This combination of an Acropolis with its Piræus and its Attica is common throughout Mediterranean Europe, though less frequent in the north; and such a threefold co-operation is conducive alike to agricultural efficiency, to maritime enterprise and commerce, and to regional as well as civic culture. Thus we see the traditional comparison of Edinburgh with Athens has really little to do with our eighteenth and nineteenth century imitations of Greek temples or Greek sophistries, but lies far deeper, in geographical and historical origins.

The Roman occupation had no use for Edinburgh, though its defences and monuments are not far to seek around. Yet at least one far older, indeed prehistoric, survival remains significant through the ages, and is even beginning to renew its old-world life in these present years. Every rambler round Arthur's Seat must notice the long range and succession of prehistoric cultivation terraces which rise like a gigantic stairway upon its gentle and sheltered eastward slope—terraces unmistakably of the same essential build as those which line the Mediterranean coasts from Spain and Portugal to Palestine, and thence run eastward through Persia to Korea. Traces of what are plainly kindred terraces, and better situated ones, are still discernible upon the southward slope of old Edinburgh; and the traveller of historic interests need hardly be reminded how these old terraces have constantly furnished the base-line for fortress walls in the Middle Ages; yet how they also developed into the stately Renaissance terrace-gardens of the succeeding and more pleasure-loving time. Mr. Mears' illustration (Fig. 4, p. 304) shows these terraces taken from their immemorial peaceful use to afford the lines and bases for successive city walls, with at least one great defensive bastion—that of the West Bow. We find them next becoming built over, or, where surviving at all, largely deteriorating into slum areas, sometimes even derelict, their very ownership forgotten; yet at length becoming once more renewed as gardens for the people. Thus, after long ages of warlike history, our women and children are returning to their gentle tasks of old, their setting of herb and tending of flower. This is but a small example, yet a vital one, of the renewing modern life and use of even what may have been a forgotten past: in this case, the longest forgotten. Thus one survival after another becomes in its turn significant; for the soil of the past teems with its dormant seeds, each ready to leap into life anew, be this as weed or flower.

The section across the head of the Old Town shows the terraces as the necessary sites of defensive walls, and thus explains the early origins of that congestion of recent and even present times, which is still so serious a difficulty for Edinburgh. For though the walls are forgotten,

the resultant land-values remain not a little prohibitive. It explains, again, that deficient water-supply which was so long an efficient cause of the historic dirt of old Edinburgh; while this dirt and that overcrowding, with their accompanying intensity and increasing variety of disease, have been prime factors in the development of Edinburgh as once and again the metropolis of medicine, just as the fire calls out the fireman's powers, the wreck the sailor's. It is by no mere accident that Pasteur, and his foremost disciple Lister, should have been aroused to their cleansing tasks in the midst of cities so pre-eminent in their overcrowding, their dirt and disease, as old Paris and old Edinburgh. Thus our city survey continually brings out the strange alternation and interaction of good and evil, evil and good.

Take, now, the later perspective of Edinburgh at the conclusion of the Middle Ages and the coming on of the Reformation (Fig. 9, p. 313). Just as the Reformation in England was a generation later than in Germany, so in Scotland it was a generation later still; and hence an intensification of the wars between England and Scotland. Recall, now, what to an Englishman seems a well-nigh forgotten incident, the battle of Flodden in 1513, so disastrous to Edinburgh that traditionally only one survivor returned; and then see, in the remains of the Flodden Wall, thereafter hastily pushed out beyond the then existing ones, the marks of hurried and unskilled building against the threatened invasion by the victor. This invasion, however, did not come for another generation: then note the remarkable early drawing (Plate A), presumably by the war correspondent accompanying the Earl of Hertford's invasion of 1544, and showing his advance to the taking and destruction of Edinburgh, and again that showing the siege of 1573. Now realise the immediate consequence of such repeated calamities (and there were far more)—a community denuded time after time of its active men—fathers and sons swept away in successive generations, with few save women, children, and old men left, and with unnumbered fugitives from the devastated country crowding in, time after time, to take shelter behind the walls. Here, then, are conditions, among the most intense in history, for that evolution of overcrowding and squalor, with their attendant and complicating evils, which to this day are the reproach of old Edinburgh and her most tragic legacy from the past.

The complex strife and civil wars of the Reformation continued long. They were followed little more than a generation later by another largely ruinous disaster to Edinburgh as the metropolis, in the accession of King James VI. to the English crown. In less than another generation and a half begin the new calamities of civil war, of Cromwellian defeats and occupation: then, again, after the Restoration, the ruthless persecution of the Covenanters, with practically a renewing of the Civil Wars under Charles II. and James II. Next, the difficulties of the Revolution of 1688; and yet again a ruin of Edinburgh as the centre of Parliament (and its expenditures) by the Union of the Parliaments in 1707, while following upon this came successively the collapse of Scottish Imperialism in the Darien scheme, and the Civil Wars of 1715 and 1745. Each of these events, at the time tragic enough, is recorded

in the monuments and buildings of our city, or in the ruins and dilapidations of these; and the conception thus grows clearer of one of the most distressful of old countries, in which each and all the evils destructive of historic cities have raged by turns, if not together, and that repeatedly, seldom sparing a generation from the end of the thirteenth century to well on in the eighteenth. The impassioned and adventurous Scot, colonising or militant, political and ruling, and the canny Scot, cautious and reserved to an extravagant degree, who by turns appear to the romantic or the practical Englishman as the essential and predominant Scottish type, have thus both been developed in such a troubled environment, the one by facing it among his fellows, the other by shrinking into his own small affairs: and the strange yet constant alternations of our Edinburgh architecture—here of picturesqueness, there of utilitarian plainness—thus appear as the natural and necessary expressions in architecture of these contrasted social types. Architecture and town-planning in such a city, we thus plainly see, are not the mere products of the quiet drawing-office as some believe them; they are the expressions of the local history, the civic and national changes of mood and contrasts of mind. Here, indeed, is an answer to those town-planners who design a shell, and then pack their snail of a would-be progressive city into it, not discerning that the only real and well-fitting shell is that which the creature at its growing periods throws out from its own life. This is no doctrine of *laissez faire*: it is simply the recognition that each generation, and in this, each essential type and group of it, must express its own life, and thus make its contribution to its city in its own characteristic way.

Returning to the elementary standpoint of town study, the growth of our mediæval town may now be traced downwards, from the Castle and its vacant space—the military zone of a bow-shot distance—beyond which we descend by the steep Castle Wynd, now a staircase, to the spacious old Grassmarket, from the earliest times the agricultural import centre of the city until the recent removal of our cattle-markets. At the same point begins the narrow Castlehill, the earliest suburb, and evidently at the outset a mean one. This soon widens, however, into the spacious Lawnmarket and High Street, 100 feet broad, laid out in the twelfth century as the centre of a new town complete with church and gardens: and formerly arcaded on either side—in its day, as the letters of French or Venetian Ambassadors in Scotland show, the stateliest street in Europe. To meet the gate of this old Edinburgh midway down the ridge there begins uphill from Holyrood Abbey, the Canongait—from the first a garden suburb: and after the plunder of the Reformation largely made up of the mansions of the nobles, a few of which survive to this day.

Note, next, outside the Burgh to the south, the situation taken up by the various orders of Friars. Then see how their old preaching intensity renews in that of the Reformation and the Covenant, and again in later times. For to this day the "Old Greyfriars" churchyard is the Campo Santo of Scotland; and this again has made Edinburgh the successor of Geneva as the central and sacred city of the Calvinist world.

Note, again, how it is in this very area we trace the beginnings of the development of the University, of hospitals, and great schools. Compare this now with Oxford, and see how colleges arose in the exactly corresponding sites vacated by the Friars outside the walls. Thence go back to an earlier type still—that of Florence—and note its two great poles of tradition in religion and culture, and thus in art and architecture, afforded by the same Friars, grey and black, at Santa Maria and Santa Croce. As before, in comparison with ancient Athens, so now with notable mediæval cities, British and foreign, we see how our studies throw light upon their ancient plans. Their apparent medley is more orderly than we knew; their unique physiognomy but the individual variant of some general type.

Enough, now, of Mediæval and Renaissance Edinburgh. Let us come to the Modern world, in the main, as we know it, Utilitarian and Industrial; this, as elsewhere in Great Britain, comes into power with the Revolution of 1688. See how in old Edinburgh the new type of modern utilitarian building at once arises amid the mediæval timber-work and the Renaissance stone mansions, in the tall block proudly inscribed by its builder-architect, the seventh King's master-mason of his family, as "Milne's Court, 1690," and recently repaired by the city authorities. With the revival of agriculture consequent upon peace, and the increase of commerce helped by the rise of the new trading class upon the ruins of the Cavaliers, the improvement of the old town begins more rapidly a generation later with small beginnings of formal planning; for after the opening up of James Court (1726) we venture next to build a John Street, off Canongate, the small Brown Square, and at length lay out the spacious George Square. The Jacobite wars of 1715 and 1745 are, after all, but minor interruptions of this growing prosperity; and half a generation later the increasingly prosperous Edinburgh community, stirred, no doubt, by the contemporary improvement of London, then beginning to lay out its spacious and dignified squares, resolved, under the leadership of a really great edile, Lord Provost Drummond, upon city development and town-planning proper. Hence Craig's "Plan of the New Town" of 1765, which was realised in the generation ending with 1800. The original New Town had next its northern extension by 1822, and thence to 1830. Examples of the high state of town-planning in 1817 are found in the series of plans selected from a competition held by the Corporation of Edinburgh in 1817, for the area northward of Calton Hill.[1] Here, then, we have a period of town-planning and of architectural execution surpassing even the lesson of London; yet breaking down, also, in its turn.

Our series of plans show this progress of design and construction, yet also bring out the reason of their arrest and breakdown, with abandonment of their unused spaces to contemporary squalor or confusion. These town-planners, with all their merits, made various grave mistakes. First, they omitted adequate consideration of relief and

[1] These are figured in the *Architectural Review* of October 1910. Copies are also in the Outlook Tower.

contour, and thus their office-made schemes broke down wherever the ground became seriously irregular, so demanding unforeseen outlays for foundations—here upon cliffs, or there on marshy hollows. They failed then very largely for want of a proper topographical survey and its contour-models: but also, and even more seriously, for want of any adequate social survey. These competitive plans show plainly that the designers—clients and corporations alike—assumed a practically indefinitely increasing population of the well-to-do—the lawyers, country gentlemen, merchants, and others for whom the new town was designed; and they forgot entirely, after the New Town Plan of 1765, with its first instalment of three rich streets and two poor ones, to provide for cheaper burgher dwellings, much less for workmen's homes. Thirdly, they omitted from consideration any provision for anything so vulgar as workshops, for any industry whatsoever; and, consequently, the formal beauty for which they had laboured was soon broken in upon and at many places destroyed by the necessary and inevitable filling up of any and every vacant space with any and every sort of irregular and utilitarian factory and workshop, as may be seen, for instance, in the dramatic contrast of stately residential order and planless squalor on opposite sides of the same street, *e.g.* Fettes Row, of the same monument even—witness St. Stephen's Church.

Does not, then, our study bring its gentle but decided criticism to bear upon much of the town-planning of our time, which, with all its specialising upon communications here or comfortable dwellings there, there forgets the industrial development, or even the small workshops, and here the popular well-being upon which every town essentially depends?

Turn now to our æsthetic town-planning. The builders of the new town at first cared little for the romantic old one they had deserted. Their ideas and tastes were classic, as were those of their time throughout Europe; and hence the classic High School, still one of the best examples of its Neo-Grecian style. Hence, too, the various classic monuments of the Calton Hill, culminating in the too colossal and unfinished colonnade of the National Monument, and more temperately continued in the Art Galleries of the Mound.

Yet the dramatic contrast of the picturesque castle and hill town with the regular and utilitarian modern new town, which is to this day the most striking of the many panoramic features of Edinburgh, was a great factor in the Romantic Movement, of which Sir Walter Scott made Edinburgh for a time the veritable capital. This new idealisation of the mediæval past, both in its temporal and its spiritual manifestations, so natural to a generation rebounding against the severe republicanism of the Revolution days, and the formal classicism of the Empire style which succeeded it, produced its speedy effect in the next generation. Hence that efflorescence of castellated gaols and "Scottish baronial" tenements or villas with which the next generation followed the architectural well-nigh as fully as the literary inspiration of Abbotsford.

This Calton Hill, with its strange medley of monuments, is thus a

museum of the battle of the styles, and a permanent evidence showing how the town-planners of one generation cannot safely count upon continuance by those of the next. This is not an argument against town-planning; but it brings out clearly the proposition that we shall do best by supplying the needs and expressing the ideas of our opening generation, without too great expectation of agreement from the next one, much less attempt to dominate it.

New churches, too, arose for all denominations—bad, good, or mostly at best indifferent—culminating in magnitude at least in St. Mary's Cathedral by Sir Gilbert Scott; which was, till Truro Cathedral surpassed it, the largest and most ambitious ecclesiastical edifice since the Reformation.

The romantic planners are now left behind by their successors. A period of new communications had been already opening, with its new and wider roads, its embankments, bridges, and viaducts. There is more civil engineering of this kind in Edinburgh than in any other city we know of. Our plans again bring out notable consequences of this development, yet equally unforeseen. On one side a disastrous increase in the social separation of classes, who had been in old Edinburgh so peculiarly mingled; so that the upper and middle classes have been wont to traverse old Edinburgh by viaducts high above the festering squalor below, and to live and die in practical indifference to it, and thus maintain that practical indifference to deplorable conditions which strikes every Continental visitor, even every American tourist, with an outspoken astonishment far from flattering to Edinburgh, yet for the same reason with too little effect upon it. Yet note also how this series of achievements of civil engineering culminates, for the city itself, in the beautiful Dean Bridge, which is one of Telford's masterpieces; while a few miles further on we come to the natural outlet and main highway of Edinburgh—that of the Forth Bridge, which but replaces its old Queen's Ferry. This most colossal of engineering achievements appears in its true light as a regional and therefore normal and natural product, when we consider the immediate civic environment of civil engineering achievements, each a triumph in its day, in which its promoters and its first designers grew up from boyhood. In an analogous connection the Forth and Clyde Canal, once of small barges, then of incipient steamships, and through the Railway Age in comparative insignificance, is now likely to give place to a Forth and Clyde Canal upon the oceanic scale, necessarily with unseen future transformations for Edinburgh. Almost since its foundation, and for many years before the present public interest, the alternative routes for this canal were on exhibition in the Outlook Tower, with a suggestion of their future Garden City, stretching from sea to sea.

From the great civil engineering of roads and bridges to the Railway Age which followed is, however, not so distinct a progress—in fact much otherwise, as our map of the development of the railway system of Edinburgh (Fig. 1) so tragically shows. This development of the old carrier system of Edinburgh by the "new firm of carriers," as Lord Cockburn called it, naturally established its depôts as near as possible to the old

Fig. 1.—Edinburgh. Railway Development. Note now in (say) a century the unplanned railways have grown to cover an area equal to that of the whole "New Town."

places of departure for east and west (north, too, and south respectively); and these have then grown by sheer force of circumstances to their modern dimensions. Thus, too, their depôts at each side of the city naturally, almost inevitably, became linked up by the railway through the Gardens. Hence the appropriately placed statue of Lord Provost Adam Black turning his back on the scene, and uttering his dictum that "Providence had plainly designed the valley of Princes Street Gardens for a railway." The practical question, of course, here arises: "Where better could the railway have been arranged for? Would you arrest all industry and progress, and dry up the very sources of wealth from which gardens can be obtained?" See therefore upon our plan (Fig. 1) the "Innocent Railway"—the oldest line entering Edinburgh, and direct from the great Midlothian coalfield; and we venture to submit it is plain that it is this practically designed railway line which should have been developed, rather than the existing mere following up of the old horse-carrier roads and depôts, had not this latter railway planning been incompetent through lack of grasp and foresight, and had not the town-planning interest and experience of the previous generation been totally lost sight of by a generation hastening to be rich and smitten with railway mania.

Observe in detail the weltering confusion of the railway lines of competitive companies which have invaded and well-nigh destroyed Gorgie and the region between Edinburgh and Leith, which latter was being so carefully planned only one generation before!

Next consider the far simpler net of the railway system as it might and should have been, and note in this the economy in space and in time, with gain, not loss, of efficiency, time, and convenience, and with saving of the city's beauty to boot. Of course this is but a sketch, inviting criticism by the expert, with no doubt modifications in detail. It is the general principle which is here boldly affirmed, that this railway system has not been the utilitarian success it still pretends itself, but has been, not merely half-ruinous to the beauty of Edinburgh, but structurally bungled and economically wasteful to all concerned—so much so, in fact, that it may yet be a question whether it may not pay some day to transform the railway system more or less as here suggested!

Surely most railway planning, whether in Edinburgh or beyond, is the most fortuitous bungle in the long history of cities, far exceeding in its present disorder and waste of space, time, and energy (to say nothing of natural beauty or human life) anything that has been or can be alleged against the decay of the Mediæval, the Renaissance, or the eighteenth-century cities and city plans, defective though we have seen each and all of these to have been in its turn, and disastrous in its decay. This point is not as vituperation, but to bring out the essential origins and tasks of our present town study; it is the necessary rebound of a new generation against the ideas, and the lack of ideas, of our elders of the railway and industrial age, and the practical endeavour now to mitigate the material confusion and the social deterioration in which their lapse of well-nigh all sense of civic responsibility and well-being has plunged us.

Turning now from communications to population, Dr. Bartholomew's map of Edinburgh shows it growing rapidly, much like other more obviously industrial cities in this railway age. It shows how readily and completely, even in this city so peculiarly inspired by the tradition of the three great preceding culture-periods, all alike for practical purposes became lost so far as city development is concerned. For newer districts this has arisen from the lower and more squalid types in the main, largely that of the West Port quarter, which each succeeding town plan unhappily neglected. Witness the wretchedly unplanned industrial suburb of Dalry, etc., which chokes the western exit: witness, too, the confusion, stretching far and near, round Holyrood, or that on the eastern and northerly quarters of Leith.

This zone of sordid industrial districts surrounding—say, indeed, immersing—the old town and the planned new town alike, has thus grown in a vicious circle with the misgrowth of the railway system, and our plans show plainly how Edinburgh has become, as far as it could, an ordinary manufacturing town—at many points now able to match Dundee, Glasgow, or Lancashire towns in their characteristic perspectives of squalor and dreariness of homes, of monotonous confusion of mean streets.

Yet we must not merely blame the early railway age or its continuators: nor do we forget the recent laying out of districts of house and garden for the prosperous community, and to-day for the workers as well. This industrial confusion is but the Nemesis of that forgetfulness of workshops and workers' homes which we noted in early nineteenth-century planning.

We are thus coming plainly abreast of the modern situation, and this as we see it in less obviously historic cities than Edinburgh; and we are now ready to criticise, not merely the apathetic standpoint of yesterday, but the well-intentioned efforts of to-day, when the community begins to look towards the problem of redressing the disorder which has thus thoughtlessly grown up.

Are, then, industrial developments to be discouraged, and the city to be left to its lawyers and parsons, its doctors and professors, to its retired villas and its conspicuous slums? Not so. The general and geological maps show exactly where the future industrial development of Edinburgh should be, and therefore will be, because it will pay to be —pay in energy and efficiency, in health and beauty, and therefore in money also. It will be upon that "Innocent Railway" which we saw for urban reasons should have been developed from the first, and now should be for regional reasons also. And it will be upon and beside the Midlothian coalfield, which, happily, lies east, not west of the city, and has its smoke mainly blown out to sea. Smoke, of course, is mere waste, soon to be suppressed by a more economic and more truly utilitarian civilisation, while, with this, an adequate development of electrical power, lighting and heating systems must naturally also arise, and this not only for its own uses, but also improving existing Edinburgh in ways for which a volume is required. Our survey, in fact, points straight towards its sequel; that of a Report with Plans of this

possible Newer Edinburgh, an industrial city and a garden city in one.

An indication of this growth, as already in instructive and unconscious progress—though for that reason unfortunately as yet quite unplanned—is afforded by the growing brewery village of New Duddingston. This exodus of the breweries from Central Edinburgh next begins to raise the question of the reorganisation of the present industrial confusion, and, with this, of the working-class quarters within the old town—in short, we have to supplement our vision of a newer Edinburgh by one of a better old Edinburgh also. We are, in fact, entering upon a period like that of 1765, upon a new spiral, of course; let us hope a less defective one. Does not, then, this study unmistakably bring out, not only the interest and the possibility of our Survey of a City, but its direct practical use—the way in which retrospect, rightly interpreted, not only illuminates the present, but sweeps through this, and forward again into intelligent foresight? With our greater populations and resources, our graver problems, our more anxious responsibilities, we are compelled to still greater magnitude of design than were our predecessors; but surely also to fuller reflection, to completer provision for all the many needs of life. Now the impending extension of the city gives room for an enlargement of its powers to an extent worthy alike of the opening social future, and of the continued place of Scotland as one of the Great Powers—of Culture, if no longer of material forces and alliances: of Edinburgh as one of the Great Cities—for in history those alone are great whose spiritual forces and influences are most out of proportion to their mere numbers.

II.

The preceding criticism of the recent industrial order, or rather lack of order, together with the complemental indication of a policy of improvement within the city, and of expansion without, has brought us more fully up to the contemporary interests of active citizens than our far-away manner of opening seemed to promise. Yet, instead of now suggesting schemes for industrial and garden villages without, or of new clearances or thoroughfares within, as the prevalent custom is, let us simply return to our Survey, still far from ended—indeed, really only beginning for truly modern purposes with our disillusionment with the "progress" of the industrial and railway age.

Let us resort rather to that form of mental relief common to all save the poorest classes of our industrial world—that of taking the tourist and holiday view of Edinburgh, from which indeed our city largely derives its wealth, like much of Scotland.

There are two ways of looking at old Edinburgh—as a centre, indeed a very metropolis—of Squalor, yet likewise of Romance. We are preparing now to finally get rid of the appalling squalor of the old town in its buildings and courts, and correspondingly of its slum life. Throughout the nineteenth century, as already indicated, this state of things has been mainly accepted by the middle and governing classes as a permanent

supply of human material for its confused charities, for its vast schools of medicine and anatomy, and for its manifold religious endeavours. Yet, as the medical school has its long roll of heroes, of whom Simpson and Lister are but the chief, so the philanthropists and divines have also largely justified themselves in types like Dr. Guthrie, the organiser of ragged schools, and Dr. Chalmers, the originator of the Elberfeld system, or Dr. Begg, a pioneer in housing many years ago; while the too sweeping would-be sanitary clearances, like those of Provost William Chambers and most of his successors, are also seen to be not entirely inexcusable, despite their inevitable resultants of transferred pressure in higher local rents, land-values, and general taxes, etc.

For Romance, on the other hand, we may think of the Old Town as represented in Mr. Bruce Home's admirable drawings or in the "Old Edinburgh Street" of the International Exhibition of 1886, probably the most admirable reconstruction of an ancient city yet effected, and a suggestion of what may yet be done in some of our old quarters in permanent form. Beginnings of this domestic revival have, in fact, since been made at Dean Village, and in High Street, etc., as in the buildings of University Hall, and later in the renovation of Moubray House and Milne's Court.

The exact coincidence, both in time and space, of this revival in domestic architecture, with the romantic tales and admirable "Edinburgh" of Robert Louis Stevenson, once more show how the mental attitude of a generation and its expression in material and literary art are normally at one. All are plainly derived from Scott, and arise by the revival of his spirit in presence of the broken survivals of his picturesque environment before the inroad of the railway and full onset of the industrial and financial age. The restoration of the interior of St. Giles' and that of Edinburgh Castle are similar and contemporary examples of the work of the past generation at its best. This connection is still more plain when we note that both these great works were carried out at the initiative and expense of William Chambers and of William Nelson respectively, two of our leading printers and publishers —a group among whom there still reappear, perhaps more naturally than in any other class, the combined virtues of scholar and of citizen.

Our Survey may next turn to what can be done here and there meanwhile with moderate means and ordinary folk, with such labour and time as they can spare. Hence our "Outlook Tower Open Spaces Committee," with its survey of every open space amid the slums; and these within the "Historic Mile," despite its overcrowding, amount to no less than seventy-five pieces, measuring about ten acres in all. This Survey again leads to "Report"—that is to plan, to action; and ten or a dozen of these have already been reclaimed into gardens, accessible to school and street children and to women, to the people generally, whilst others are in preparation as circumstances and scanty funds allow. Thus appears again the principle and point of view of the whole historic survey by calling attention to these as a veritable renewal of the cultivation terraces of our initial and prehistoric survey. As a practical point it may be added that, despite all that is too commonly said of rough

population and the rest, no mischief worth mentioning is ever done. The gardens are appreciated, and their educating, civilising influence already plain, and spreading in ways too varied and complex for consideration here.

From the standpoint of the historic survey, note further how the recent admirable extension of allotment cultivation just outside the town limits throws light upon the origin of the spacious gardens of the old-world friars upon our mediæval town-maps; and these, not only in Edinburgh, but in Oxford, in Florence, and other old cities. Hence—the speculation is at least harmless— might not this similarly useful and re-educational type of cultivation again lead us towards some other new and unexpected development of town-growth, in its way also beautiful, as did that of old? May it not have some latent part in that next evolution of our city for the better, which is the happier side of that judgment-day which our historic and sociological survey shows is always going on? May it not even again be said by the Ideal of Progress—"Inasmuch as ye did it unto the least of these, ye did it unto Me"?

Leave now our small gardens in progress. Leave undescribed also our little beginnings of Garden Villages in Edinburgh, though the oldest in Scotland and among the earliest in Britain. For a higher outlook and a larger future, let us return to the ancient heart and focus of our city, the ridge of old Edinburgh. Notice again in this connection the survey by our foremost Edinburgh antiquary and civic artist, Mr. Bruce Home, showing every historic building still surviving: yet let us frankly recognise that interesting though these old buildings may be, their survival must essentially depend upon such possibilities of utilisation as they can show.

Such for instance is the work of the Town and Gown Association, a scheme also extended to Chelsea, which has succeeded in re-erecting Crosby Hall.

Here, then, we have a new principle and method of town-planning—and, indeed, of city design. It is the combination, in each city, of its antiquarian piety, and its conservative artistic purpose, with architectural ability and business management: this towards a twofold purpose—on one side that of collegiate efficiency; on the other, that of civic betterment.

Here is, in fact, the gradual working-out of a scheme of collegiate development, especially adapted to our larger University cities, and not, as too much in older types, independently of the existing city, and by mere destruction and replacement of its buildings. On the contrary, it seeks, on grounds alike economical and social, to conserve and incorporate existing buildings. Hence our large perspective of the upper third of the ridge of old Edinburgh now becomes intelligible as a definite and gradually unifying scheme: not simply for the cleansing and conservation of the historic remnants of old Edinburgh, but for the development of this into a collegiate street and city comparable in its way with the magnificent High Street of Oxford and its noble surroundings. Not, of course, comparable in the same forms of collegiate splendour: but none the less in the definite and practical way, of

Fig. 2.—Perspective (by G. S. Aitken) of "Old Town," from Bank westwards, showing University Hall Improvement Scheme (in progress since 1887).

ultimate student numbers, and in excellent and, in their way, not less educative conditions. Historic houses have thus been renewed; old courts cleansed, repaired, and modestly rebeautified; and City and University, too long dissociated, begin to find themselves entering into renewing contacts, in which that tradition of culture in democracy, which is the peculiar heritage and glory of Scottish education, may be not only maintained, but developed towards new and higher issues. Thus, then, the long discord of antiquarian sentiment and utilitarian realism is beginning to find a renewed harmony; and our studious Survey is rising once more towards practical purpose.

At the outset we noted the fear that surveys might delay action. But has it not been shown in practice how survey, with its interpretation, illuminates the path for action, and this alike as regards its dangerous and its hopeful possibilities? Our survey, in short, leads towards a corresponding "Report on City Development": and this is in preparation, and on lines not less, but more, comprehensive than those of "City Development"[1] with regard to the small yet deeply significant City of Dunfermline.

Here, however, it is sufficient to give some simple indication of the method and spirit of a possible Report—reports arise necessarily from such Survey. First, as regards the method: this we briefly express by our juxtaposition of two plans of the city. The first is the ordinary Directory map of the city, tinted here and there to show how it has grown upon its physical contour and geographical situation. The second is a rough experimental sketch towards the bettered city of the opening generation. For the past it shows the acceptance of the natural environment with the conservation of the historic heritage—the best work of each and every generation. As regards the present, we seek at once social betterment and economic efficiency: while as regards the opening future, we venture more and more boldly upon that social and cultural evolution, at once civic and educational, which surely expresses the best tradition and the highest hope of Edinburgh Old and New. This needed Report on Edinburgh and its Town Planning, then, is no mere matter of street-making, or house-building, however respectably improved upon conditions present or past. It is a City Design: and this not only of material process, but of idealistic progress, for except the Ideal plan the city, they labour in vain that build it.

We are encouraged by many signs (*e.g.* that of the recent Report of the Merchant Company) to believe that the municipal policy and the civic statesmanship of Edinburgh may increasingly rise beyond such present promise as is that of concealment under tramway wires and adornment by their poles; and even beyond its suburban industrial development. For Edinburgh is not simply the foremost of Scottish University cities: to any one who will survey its historic productivity, and can discern its present and opening possibilities, it is no less than one of the realisably foremost, since most truly metropolitan and encyclopædic, universities of the English-speaking world: and with

[1] Edinburgh, 1904.

but few superiors, and yet fewer rivals, upon the Continent itself. Again, while the current Housing and Garden City movement is rightly based on the revival of the old and peaceful beauty of the English village, the needed larger movement of City Development can be inspired and headed by no better city than Edinburgh. For such rare heritage—of beauty, of intellectual and practical endeavour, and of moral and spiritual intensity—however temporarily forgotten or depressed—cannot but again be renewed and combined into creative activity, and these of world-wide influence and example.

Hence, as our survey begins with the Castle upon the Rock, so it ends appropriately with these castles in the air. Let our successors materialise them in their turn.

Civic Survey thus ranges through wide limits: from direct and ruthless realism on the one hand, to civic idealism on the other. For there is no real incompatibility between the power of seeing the thing as it is —the Town as Place, as Work, as Folk—and the power of seeing things as they may be—the City of Etho-Polity, Culture and Art. Our city surveys, in fact, descend throughout their veritable inferno, yet ascend towards corresponding circles of higher life. What are these circles of ascent or of decline? The needful stereoscopic device of thought—the analyses of a strangely mingled and ever-changing ebb and flow, the rise and fall of historic and individual evolution.

As final expressions, then, of our survey and of its practical purpose, our illustrations of it in the Cities Exhibition end with two symbols: First, the model of the City Cross, as summing up the vicissitudes of old Edinburgh for centuries past, built in mediæval times, transformed at the Reformation, demolished in the utilitarian period, partly re-erected —thanks to Sir Walter Scott—in the romantic age, and finally re-erected and restored to civic uses. Hence this Cross is peculiarly fitting as a symbol not only of Citizenship, but of Civic Revivance; and as complementing that Relief Model of Edinburgh, with which we start as conditioning the material origins of the town, by a corresponding expression of the deeper and inner evolution of the city. The many-sided activities of a great city, spiritual and social, educational and hygienic, architectural and industrial—or most simply ideal and material—all these may be fitly symbolised upon the many sides of this characteristic building as aspects of a real unity; and this unity again, by the shaft of the Cross, as an ascent of life towards fitting expression—pointedly individual because also civic and national. Yet as each phase of development of our survey has come and gone, so in turn may this presentment of it. All surveys need perpetual renewal; and our final exhibit is thus a plain office-model of the Outlook Tower —reduced to its simplest expression—that in which it may be adapted by any one to the problems and the tasks presented by his own immediate environment, his own region and neighbourhood, quarter and city. Hence, beside this, in the Cities and Town Planning Exhibition we lay our indications and beginnings of other surveys of cities, *e.g.* of Dunfermline and Aberdeen, of Oxford and Chelsea, of Paris and Ghent, of Benares and Jerusalem. These serve

as further evidence of the practicability of city surveys; and of these, not only as the essential local public Inquiry needed before town-planning and city-improvement schemes can be safely or sufficiently undertaken, but as helpful to municipal work of all kinds, and to civic betterment in its endless details. In conclusion, then, here is our thesis and challenge: City Surveys are urgent, practicable, and useful; so useful that they must before long become for civic statesmanship and local administration what charts now are to Admiralty and to pilot.[1]

PRIMITIVE EDINBURGH.

By F. C. Mears, Captain R.A.F., Architect.

(*With Illustrations by the Author.*)

The following sketch of the early state of Edinburgh is necessarily based more on study of the site than on historic documents.

It is difficult at first, when one is walking the streets of a crowded city, to visualise the ancient open site on which it is built, but continued observation, coupled with study of models and maps, has resulted in the conclusions set forth below.

The earliest inhabitants were free to take their pathways by the best routes over the open moors, untrammelled by boundaries or vested interests, and in the main these early tracks, consecrated by centuries of use, form the framework on which the modern city has grown.

The burgh of Edinburgh only became capital of Scotland in the fifteenth century. From that time till the middle of the eighteenth century its boundaries remained practically unaltered, and the houses of the increased population, as well as national and civic institutions, were all provided for by the overbuilding of its very large area of open spaces. The greater city of to-day has grown over and around the old centre, and in all its developments has been profoundly affected by ancient and sometimes prehistoric road lines and boundaries.

Next to the larger physical features of the site, these are amongst the most enduring elements in any old town, and if studied carefully give us very accurate information as to past conditions. Conversely, it is not without interest to consider how our coming expansion and improvement schemes are necessarily affected by, and indeed rise out of, the pattern of the ancient shell in which our community lives to-day.

Just as the pattern of the coming Greater Edinburgh will be largely determined by its past, so the position and plan of the new burgh of the twelfth century were influenced by the already existing Hill Fort,

[1] Further particulars of the methods of City Survey may be obtained from the Outlook Tower, or from the Cities and Town Planning Exhibition; or (at present most conveniently) from the Secretary, Regional Association, 11 Tavistock Square, London, W.C. 2.

its suburb, and approach roads. Yet, again, the character of this fort, and the cause of its later importance, can only be understood by con-

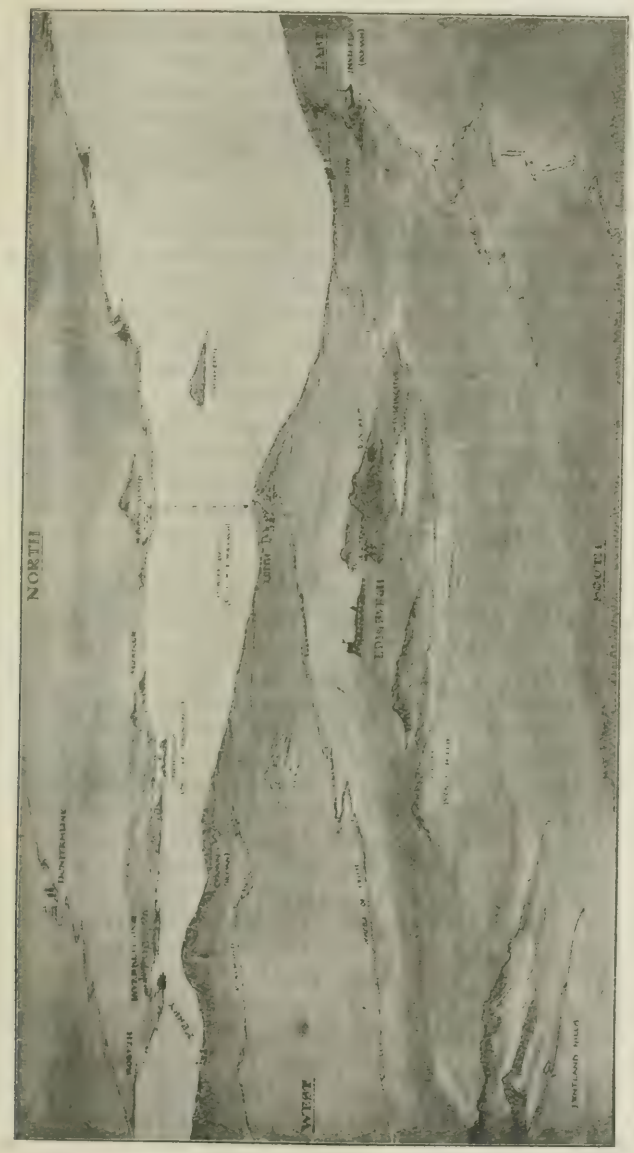


Fig. 3.—Diagram showing relations of—1. Inveresk–Fisher Row. 2. Dunsapie–Duddingston–Fisher Row. 3. Edinburgh–Leith. 4. Dunfermline–Inverkeithing.

sideration of the occupation of the district by the Romans, and by comparison with similar places of refuge which were products of the unsettled times following their retiral.

The Roman Occupation.

The Romans appear to have had no station of importance at Edinburgh. They doubtless maintained an outpost on the Rock, but their principal settlement in the district was at Inveresk (Fig. 3). This site had many advantages for continuous occupation over that of Edinburgh. There is a low but defensible hill partly protected by a river bend, and with an assured water supply. The surrounding ground is sheltered, and the alluvial soil good for cultivation. The river mouth is reasonably sheltered from the east, was under the immediate protection of the camp, and there were ample resources of river, sea, and shell-fish.

No other site on the south side[1] of the Forth Estuary gave so many advantages, and it had in addition the great one of an open approach from the pass at Soutra on the Lammermuirs. Any road taking a more westerly line from Soutra towards Queensferry and the Wall, would have to cross the deep valleys of the North Esk and South Esk as well as many of their tributaries, and, after passing close to the Pentlands and over the very irregular site of the present city, it would meet with the obstacle of Corstorphine Hill. Such a road would be difficult to patrol, and inconvenient for convoys. The exposed Rock of Edinburgh, inconvenient of access, without resources of food and water, and with its river mouth too far away and exposed to the east, can have offered few attractions to the Romans after their long journey by sea or over the Border hills.

The Roman road from Inveresk to Cramond and Queensferry appears to have crossed the Esk on the line of the old bridge, and to have passed thence through Fisherrow to Magdalen Bridge. From Magdalen Bridge there are two roads of early date, one leading direct to Duddingston, where it formerly stopped; the other passing along the coast to the west end of Portobello, where its present abrupt turn towards Edinburgh is clearly not the old line. Possibly the original course from this point was along the crest of the fifty-foot raised beach—which is directly on the line of the High Street—across the hollow by Fillyside, and thence again on the fifty-foot beach past Leith Poorhouse.

The Fishwives Causeway, which is often stated to have a Roman origin, has been almost entirely obliterated, and it is difficult to define its exact course. The lane which bears the name to-day is shown on a plan of 1783 as a probable deviation. (Baird's *Duddingston and Portobello*, map on p. 294.) After leaving the main road at Figgate Burn, it passed westwards on the south of the main railway line until it joined the next mentioned road near Piershill. Fishwives Causeway was undoubtedly an early road, since it formed the northern boundary of Duddingston Parish.

There are distinct indications of an early road branching to the left of the southern Roman road to Inveresk near Pathhead, and leading

[1] Inverkeithing, on the north side of the ferry, offers many similar advantages, and one would expect to find traces of a late Roman settlement near the harbour. There are cultivation terraces close to the railway which might repay exploration.

straight to Leith *via* Chesterhill, east of Dalkeith, Cauldcoats, Niddrie, east side of Duddingston Park and Willowbrae Road. At Piershill the road appears to have taken a straight course on the east side of Piershill Barracks to Restalrig, joining up with Fishwives Causeway on the way. It is quite clear from the surviving portions that it did not lead to Edinburgh. It has all the appearance of being an engineered road and not a track, and numerous indications point to its early date.

This suggests that the Romans, after they had strengthened their grip on the country, gave up Inveresk as an important military station and harbour in favour of one nearer the end of the Wall.

After leaving the hills below Soutra, they made a new and better road straight from Pathhead to Inverleith, so as to avoid the exposed length of coast road between Inveresk and Leith.

Fishwives Causeway may have been a short connecting branch from the coast road, made with the object of cutting out the worst part for Inveresk traffic.

Charters, quoted by Mr. Curle in his book on "Newstead" (pp. 13-14), support this theory in proving that "Dere Street" passed from Soutra to Dalkeith. A road taking this line is leaving Inveresk three miles on the right, and cannot have been leading there unless it suddenly took a right angle bend.

In summary, it seems clear that the Romans, aiming, *via* the eastern road, for the crossing at Queensferry and the end of their Wall, steered clear of the barriers of the Pentland Hills and Esk Valleys, and first directed their road on Inveresk, whence it passed along the raised beaches to Cramond and westwards, avoiding the present site of Edinburgh.

Later on they made the Pathhead-Leith road and the Fishwives Causeway. This would account for the irregular arrangement of the eastern approaches to Edinburgh to-day, since the early tracks from the fort would join up with the older roads instead of leading across the country in a normal way from the beginning, as happens on the other side of the city.

The Northmen.

We have now to consider the troubled period between the time of departure of the Roman frontier forces and the rise of kingly power in Scotland.

This period is characterised by continuous attack and infiltration from the north-east of Europe. Instead of the Forth-Clyde valleys forming a frontier against the north, the whole coasts of Scotland became the debatable ground, and for long after the departure of the old central organising power there was cast on each unit of population the task of independent self-defence.

Edinburgh is a type of fortress first occupied through necessity, and not through choice. True, the Rock, when crowned by an adequate fortress, was well-nigh impregnable, but the first construction must have been called for by a great need, and its maintenance must have demanded high powers of organisation on the part of its early holders.

Such a site could not become of more than local importance until there arose a central power strong enough to garrison it, and hold it secure against all comers. Edinburgh only became the capital of Scotland because of the great strength of the castle, and not on economic or ordinary political grounds.

Had Scottish history followed a more peaceful course, the central town of this region would have grown up round Inveresk, burgh and port in one; the capital of Scotland would have been elsewhere, and the present difficult situation in regard to the annexation of Leith by Edinburgh would never have arisen.

Musselburgh's local rhyme—

> "Musselburgh was a Burgh when Edinburgh was nane,
> And Musselburgh'll be a Burgh when Edinburgh's gane,"

was founded on a very lively sense of this basic economic fact, and the cleaner industries of a new age may well settle with their garden villages around this unspoiled centre as foreshadowed by Professor Geddes on pages 290 and 291.

In the Forth Estuary this stage of localised defence is marked by a new type of settlement, in which a place of refuge is constructed several miles in rear of a river mouth. We find the requirement of easily won food supply coupled with that of a fort just far enough from the sea to make attack impossible, unless the invaders came in sufficient force to leave an adequate guard for their ships.

Dunfermline-Inverkeithing, the Binn and Burntisland, Maiden Castle, Kennoway-Innerleven, on the north; and Craigton-Abercorn, Edinburgh-Leith, Dunsapie-Fisherrow, Traprain-Tynninghame, on the south, are well-marked examples of this combination. To this period must be assigned the first serious occupation on the Rock of Edinburgh.

There is no evidence on the site of any large peaceful settlement close to the fort before the twelfth century. Had there been a town of any size on or adjoining the ridge, the plan of the "Royal Burgh" would give evidence of it. This plan is very regular, and must, in the main, have been set out on a practically clear site. Leith, too, solitary amid its sand dunes, can hardly have competed with Fisherrow in very early times. The people grouped around Inveresk, Fisherrow, and east of Arthur's Seat must have for long remained the principal social unit in the district.

The south-eastern slopes of Arthur's Seat bear evidence, in the elaborate ancient earth works which cover them, of a large and industrious settlement of long standing. Visible remains are seen in a fort on Dunsapie Hill, and especially in the imposing system of cultivation terraces which cover all the suitable slopes. There is also evidence of lake dwellings, and numerous relics of all kinds have been dug up in the neighbourhood. The site has great advantages for a primitive society over that of Edinburgh. It was probably occupied before Roman times, and its Norman church shows that it was important in the twelfth century.

Dunsapie Fort fulfils the conditions of its time in its nearness to

the sheltered river mouth with its Roman harbour works and, in addition, it has its village site on the knoll below, beside the loch of Duddingston, then much larger than it is to-day. Thus the settlement, based on its elaborate system of cultivation and on its fisheries, and well defended by its fort, must have been the largest in its region, only to be replaced by Edinburgh when conditions had changed, and the Rock, properly fortified, became of more than local importance. As seen from the south the hill-side city must, in its days of prosperity, have been one of the most picturesque in Britain, surpassing even mediæval Edinburgh in its dramatic contrasts.

The site of Dunsapie-Duddingston must be as worthy of systematic excavation as any in Scotland if, as seems certain, it directly links Roman with Scottish history.

There are indications of similar cultivation terraces on the Old Town ridge between Castle Wynd and the West Bow. Old boundary lines here run east and west along the slope, which is stepped in terraces. These have been modified in later times, and one below Johnston Terrace is defined by the only stretch of the "King's Wall" now to be seen above ground. These terraces show that Edinburgh was occupied at an early date, but they are few in number, and do not point to a settled community here on anything approaching the scale of that of Duddingston.

Before going on to details of the early fort and its approaches, it is necessary to understand clearly the main physical features of the Castle Rock and its surroundings. The hills and hollows on which Edinburgh is founded owe their main outlines to the action of a great glacier moving from west to east. The hard volcanic rocks of the district resisted erosion, and remain as prominent hills, which are precipitous towards the west. On their eastern side the softer strata, which were protected by the hard rock in front, rise in ridges which lie parallel to each other. This "crag and tail" formation is emphasised by the sharply defined horseshoe-shaped valley which lies below each crag to the west. This formation may be easily seen on a small scale in sandy streams where the sand is scooped out in front of an obstacle, and lies in a ridge behind it. It is also well shown on the large model of the site of Edinburgh in the Outlook Tower.

The Castle Rock, rising to 440 feet above sea-level, is precipitous on all sides. On the north, west, and south it gains height on account of the encircling valley (260 feet from valley to summit). (See Figs. 4 and 5.) To the east the sedimentary rocks of the ridge are at their highest point within 80 feet of the summit. Thus the easy approach is on the east, and all early tracks were focussed on that side.

The highest point of the encircling valleys is not, as might be expected, below the Castle Rock, but is at the east end of the Grassmarket (234 feet above sea-level). From this point the Cowgate valley drains eastward to Holyrood (119 feet). The other valley runs westward by King's Stables Road for a third of a mile, and then turns north round the Castle Rock, and then eastward till it unites with the Cowgate valley at Holyrood. The average slope of the Cowgate is thus

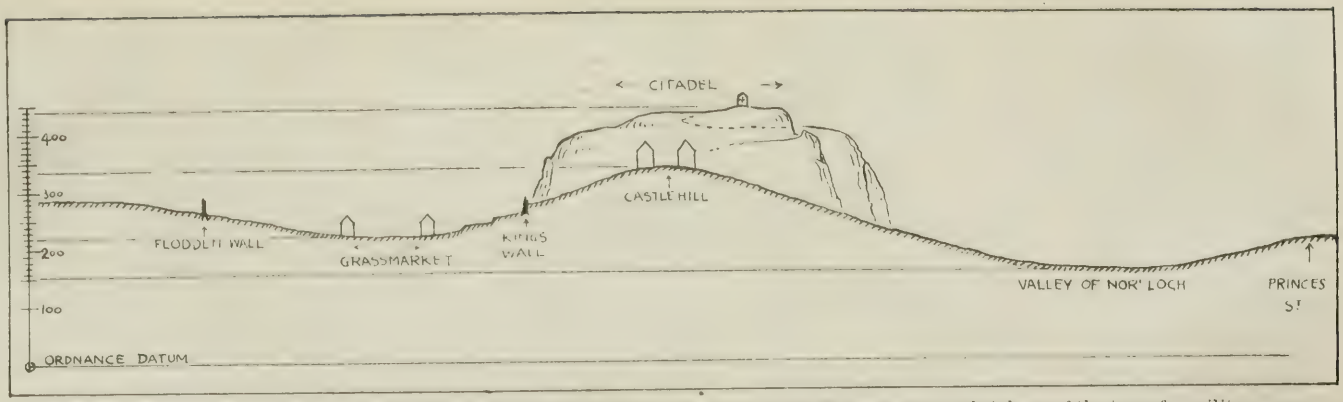


FIG. 4.—Cross section through Grassmarket and Castlehill looking west. The "King's Wall" represents a shrinkage of the town for military reasons. Had this wall followed the original burgh boundary it would have been overlooked from the high ground to the south. Even the Flodden Wall of later times suffered in part from this disadvantage.

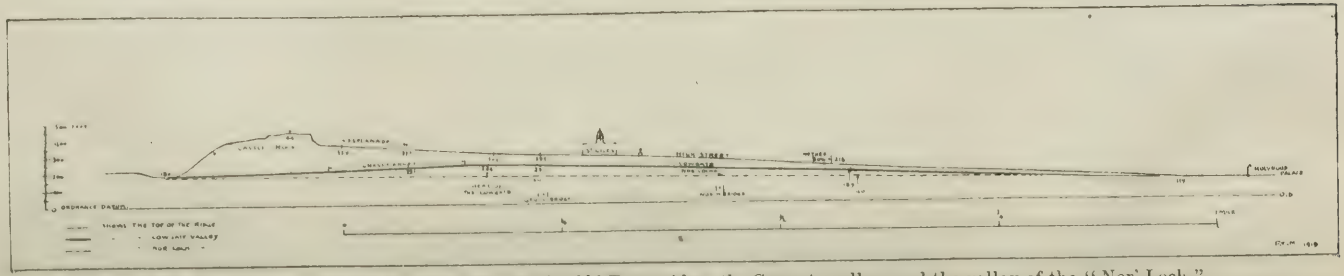


FIG. 5.—Diagram showing relative levels of the Old Town ridge, the Cowgate valley, and the valley of the "Nor' Loch."

about twice as rapid as that of the northern valley. The rise from the head of the Grassmarket to the Lawnmarket is 68 feet, and from the valley of Princes Street Gardens to the Lawnmarket 140 feet.

All tracks, except those from Leith and the East Coast, are therefore brought round to the south side of the ridge, and unite to approach the fort by the line of the ancient West Bow. The normal radiation of the roads was further affected by the strongly marked obstacles of Calton Hill, Arthur's Seat, the Burgh Loch (now the Meadows), and the valley of the Water of Leith; all of which are within a mile of the Castle. Of these, the most important was the Burgh Loch, which lay very close to the fort. Its drainage flowed westwards *via* Toll Cross into the Water of Leith at Roseburn, and it was separated from the hollow in front of St. Leonard's Crag by a low ridge, now crowned by Clerk Street.

In studying the origin of a town two factors must be borne in mind:—

1. Increase of population may be accompanied by gradual expansion and encroachment, each largely determined by natural features, older roadways, and property boundaries. Under these conditions growth will be irregular, and old boundaries will become the most permanent features in the pattern of the town, outlasting many destructions and rebuildings.

2. A definite plan may be adopted to cover a reasonably clear site. In this case a system of new roads and regular plots is laid out, and minor features and old boundaries within the area are obliterated or squared up. In Edinburgh large examples of this latter process may be found in the main High Street area of the Old Town, and in the still larger eighteenth century New Town. Both of these schemes were, however, limited by the natural features of their sites, and by the need of junction with existing highways, and in some degree by pre-existing vested interests.

The original fort of Edinburgh Rock occupied only the eastern part of the summit, which indeed always formed the Citadel (Fig. 4). This part rises 80 feet above the Esplanade level, and is about 30 feet above the area to the west, from which it is cut off by a cliff. Its area was about 1½ acres, out of a total of 9 acres enclosed by the outer wall of the Castle to-day. It must be remembered that the early Citadel was smaller by the extent of the Half-Moon Battery and part of Palace Square, which are artificial platforms resting on vaulting. The present approach road circling below the upper fortifications to Foogs Gate appears to follow the old line. The summit to the west, lightly fenced, would serve as a place of refuge for cattle in time of danger, and later would become the site of the first town below the fort gate. Survivals of this stage are found in the Records, where it is shown that monastic settlements were provided for on the Rock, and later that certain citizens were allowed to erect dwellings there.

With the organisation of the whole summit as a castle proper, a small civilian suburb grew up, a bow-shot from the gate. This extended down the narrow street now called Castle Hill, and then expanded

trumpet-wise at the head of the West Bow (see Edgar's Plan). Below, on the south, were the terraces to which reference has been made. The zigzag line of the West Bow, which made it one of the most picturesque of hill-side streets, was a twelfth century development. Earlier, the principal track went straight down the slope on the line of Anderson's Close to the head of the Cowgate and Candlemaker Row.

The Radiation of the Early Roads.

The narrow space between St. Leonard's Crag and the Burgh Loch caused the roads from the south-east to be pushed close together at some distance from the Rock, while the roads from south and south-west were deflected westward by the Burgh Loch, and united with those from the west at Main Point, near the West Port. All roads of this early time are to be thought of rather as moorland tracks, and the irregular bends of the older streets of to-day are due to small hillocks and hollows long since smoothed away or built over.

The principal early roads which approached the fort appear to be the following:—

1. The roads from Peebles, etc., unite south of the Pentland Hills, pass to west of the Braid Hills, and follow the line of Morningside Road to Toll Cross and Main Point.

2. The Lanark Road followed the northern slopes of the Pentland Hills, thence apparently came past Merchiston Castle and Burghmuirhead to Main Point.

3. The Glasgow and Stirling Roads skirted the large loch which lay south of Corstorphine Hill, and crossed the Water of Leith at Coltbridge, and then took the existing line past Haymarket to Morrison Street, Bread Street, and Main Point.

4. The Ferry Road came north of Corstorphine Hill, past Dean Village, where there is doubt as to its exact line, and then by Queensferry Street and King's Stables Road to the Grassmarket.

5. The Sea Road to Leith followed the line of Leith Walk to the narrow valley west of Calton, and then probably ran diagonally up the north side of the ridge to the Fort Gate.

6. The East Coast Road apparently left the Fishwives Causeway near Piershill, passed near Restalrig, and thence came in a straight line across the site of future Holyrood, and up the crest of the ridge direct to the Fort Gate.

7. The Roxburgh Road left "Dere Street," at Dalkeith, and came west of Craigmillar Rock, and close to St. Leonard's Crag, where it divided, one branch leading on directly to the fort, the other crossing the Old Town ridge a little east of the present Bridges, and joining the Sea Road at Calton Hollow.

8. The Selkirk Road passed close to the east end of the Burgh Loch, and united with the Roxburgh Road at Bristo Street.

Fig. 6 shows in detail, and in relation to contours, the early alignment of these two roads (marked A and B), along with the later branches of Potter Row and Pleasance, the latter being clearly an

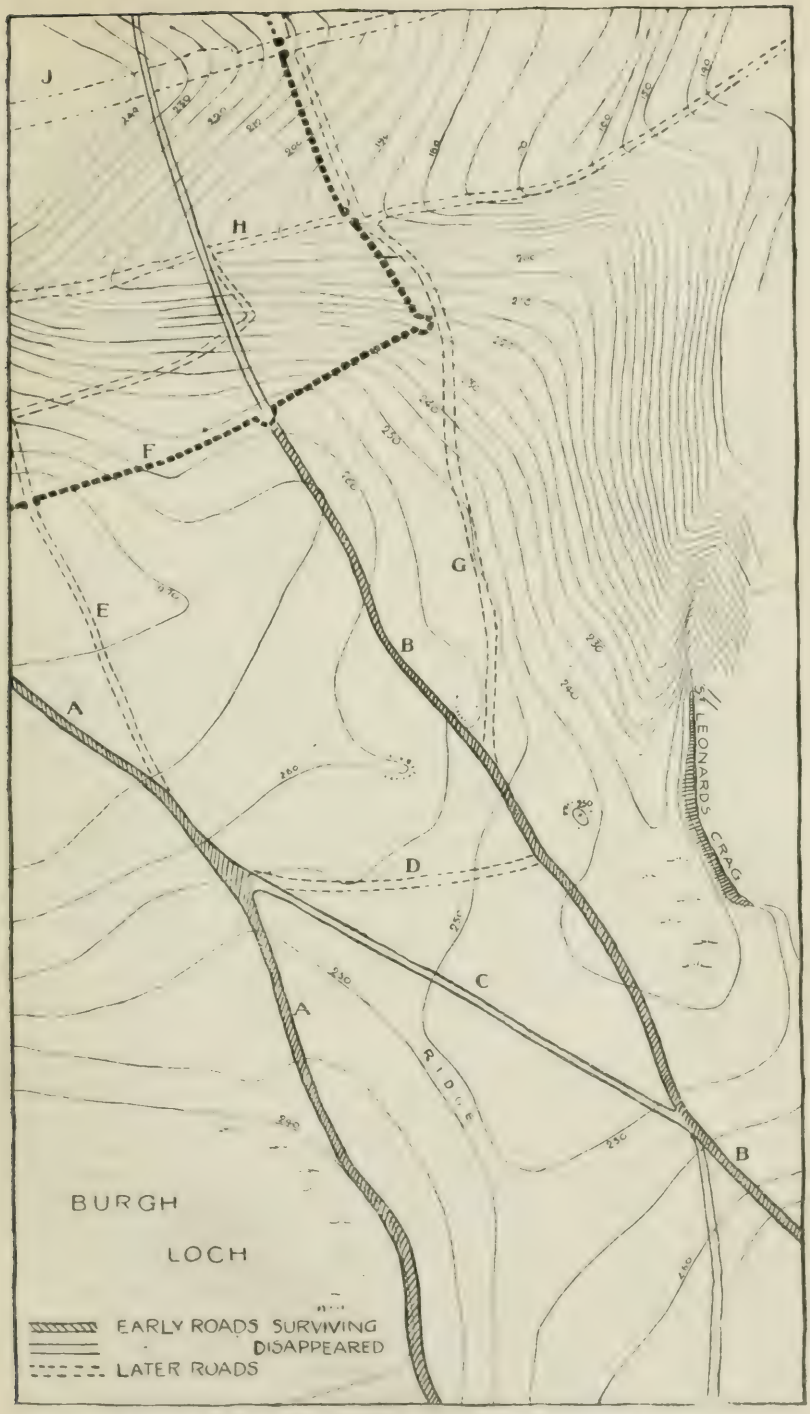


FIG. 6.—Diagram showing south-eastern approaches in relation to contours.

A Causewayside and Bristo Street leading to Candlemaker Row.
B St. Leonard's Street and road to Leith, now Roxburgh Place.
C Probable original direct track to the Fort.
D Later line of Crosscauseway.
E Potter Row leading to Mercat Cross.
F Line of Flodden Wall.
G Pleasance.
H Cowgate.
J High Street.

early thirteenth century loop made when the burgh expanded eastwards. The Potter Row led direct to the Mercat Cross, and must date from the twelfth century founding of the burgh. The Roxburgh Road is seen avoiding the hollow in front of St. Leonard's Crag. The branch leading to the sea crosses this hollow, avoids two hillocks on the right, and then takes the existing line Richmond Lane, Roxburgh Place, till stopped by the Flodden Wall, which was provided with a tower at this point. Formerly it continued northward on the line approximately of High School Wynd, and Blackfriars Wynd, and Morrison's Close to the Calton Hollow, and defined the original eastern boundary of the twelfth century burgh.

Cross Causeway is clearly not on the original line. The older road must have taken a line approximately as C, the new Cross Causeway D being set out on its present line with a view to saving labour and material, probably early in the sixteenth century, when work of this nature is recorded as in progress east of the Burgh Loch.

The older maps suggest that there was in addition a diagonal track joining the Selkirk Road to the Sea Road, but all traces of this have disappeared.

Kirkwood's map shows a good example of an exactly similar diversion of an old road a little farther south on Dalkeith Road. The old track to Niddrie by the south of Arthur's Seat formerly branched off to the left just opposite Blacket Avenue, and passed near Prestonfield to join the existing road at Peffer Mill. The map shows a new short connection at Hanmer Avenue, but this, in turn, has lapsed in favour of the present road, taking the shortest course from Cameron Bridge to Peffer Mill. This old road formed the western boundary of Duddingston Parish, and thus the line was preserved long after the road had ceased to exist. Now that this boundary has been altered, its only surviving feature on the modern map is a slight irregularity of garden walls where it branched from Dalkeith Road.

Traffic from the Port to the west probably avoided the site of Edinburgh, and followed the line of the Water of Leith *via* Canonmills and Stockbridge.

The Road to the East.—The road system from Edinburgh to the East Coast is curiously irregular. This is partly because of the large barrier of Arthur's Seat to the east of the burgh, but, apart from this and other obstacles, there are evidences of change of purpose from time to time. The first road eastwards seems to have been of patchwork character, and must have sufficed with little alteration for the horse and foot traffic of the days when Edinburgh was capital of Scotland. With the advent of the London Coach improved lines and gradients were called for, followed later by the turning of the approach line from the Old Town to the New in bridge-building days.

There is no uncertainty about the course of the track down the crest of the ridge from the fort to the foot of the Canongate, but from this point eastwards there are puzzling deviations—the sharp bend through the Water Gate and round by Abbey Hill and Spring Gardens is clearly a loop like that of the Pleasance.

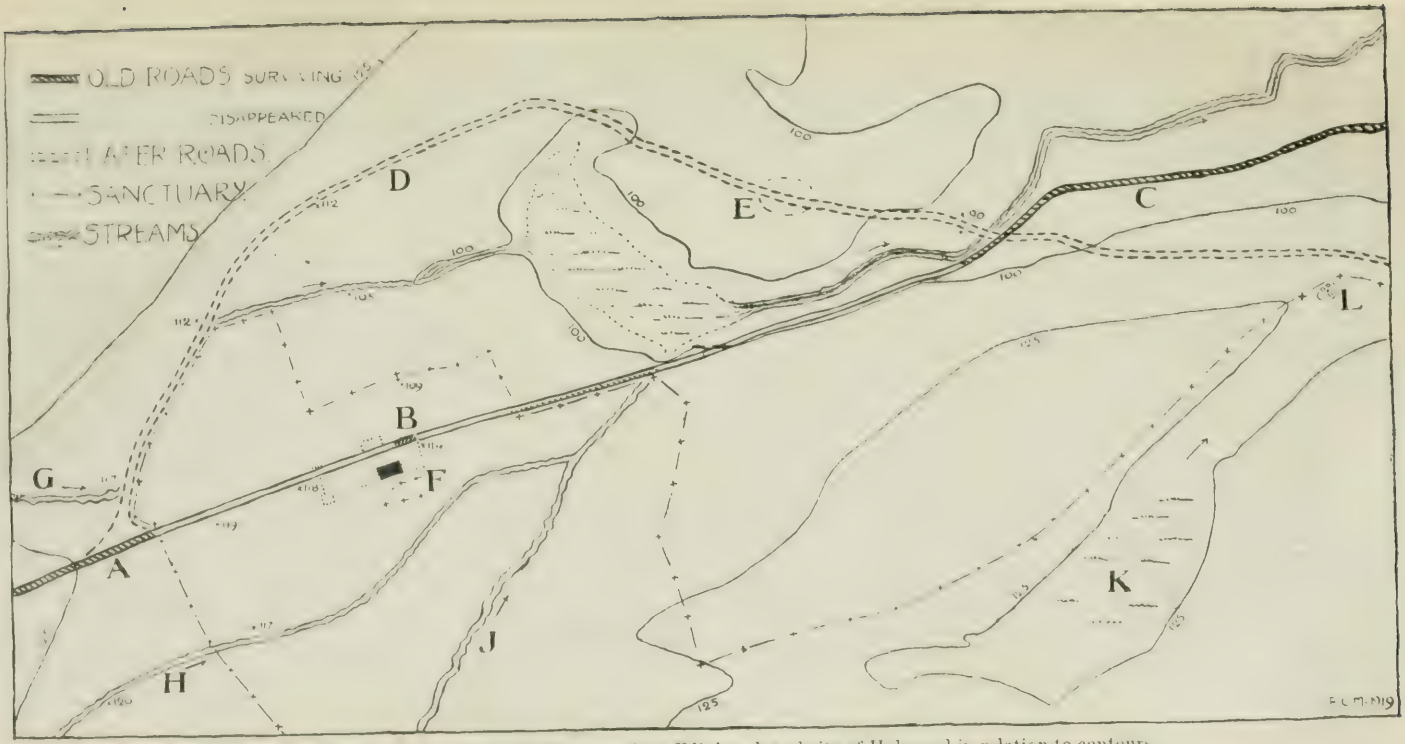


FIG. 7.—Diagram showing eastern approach to Edinburgh and site of Holyrood in relation to contours.

A Canongate.
B Early road exposed by excavation.
C Clockmill Lane.
D Abbeyhill.
E St. Ann's Brae.
F Early church. The later building is shown by dotted line.
G Stream from "Nor' Loch" valley.
H Stream from Cowgate valley.
J Stream from valley below Salisbury Crags.
K Hollow now St. Margaret's Loch.
L Muschat's Cairn.

Study of the ground in relation to the maps suggests that the older track must have continued in a straight line along the northern side of the present Abbey Church, or forty feet to the north of the early church, as shown in Fig. 7. The Old Causeway exposed during the recent excavations here is directly on a line with the foot of the Canongate, and with a stretch of the northern boundary of the Sanctuary. This line just clears the deep hollow on the left, which must have been a swamp, if not a small loch, since it received the whole drainage of the valleys on each side of the Old Town Ridge and below Salisbury Crags. The track then followed the south side of the stream until it joined the existing Clockmill Lane, which continues in a straight line to Restalrig. Connection with the East Coast Road was probably first made by a branch track joining up with Fishwives Causeway.

In early days this east approach to Edinburgh, following the side of the burn, and with the sacred wells of St. Margaret and St. Triduana, and the little early abbey spaced along its course, must have had the character of a *Via Sacra* of considerable beauty. To-day, as a neglected footpath in an arid desert of railway works, rubbish heaps, and hoardings, it is one of the most depressing byways in the city.

When Holyrood Abbey assumed its new and enlarged character in the twelfth century, this early track would be found to pass inconveniently near to the foundations of the Norman church. The diversion to the line of Abbey Hill—St. Anne's Brae—must be referred to this date. The deep hollow at Comely Gardens is the cause of this wide detour, as can readily be seen in the Diagram. The road passes along below Calton Hill, and then turns east over the hillock at St. Anne's Brae, crosses the early track at Clockmill Bridge, and rises to the 100-foot terrace, along which it passed eastwards to join Fishwives Causeway. When the post road came to be made, it was taken straight through towards Portobello, leaving the Old Causeway on the right.

With the exception of the Queensferry Road, which has been deflected beyond Dean Village, and again at the west end of Princes Street, the other main roads from north-west, west, and south-west appear to preserve their old lines with only minor modifications.

We are now in a position to sum up briefly the state of Edinburgh in the eleventh century (Fig. 8). The main road system of the present city had by this time been determined, and most of the ancient lines still survive, either in the streets or as administrative or private boundaries. In the discovery of the deviations which took place when the burgh largely replaced the Castle as a focus of traffic, we have found valuable clues which will be of service later for the determination of the extent and character of the twelfth century burgh.

The summit of the Rock was crowned by a fort, hardly yet a castle in the mediæval sense, with an outer settlement close below it on the west, and all approached by the narrow winding track cut in the Rock round the north side. At a bow-shot distance from the ridge there was a little straggling suburb spreading out to the east, with cultivation terraces below, between it and the future Grassmarket. The surround-

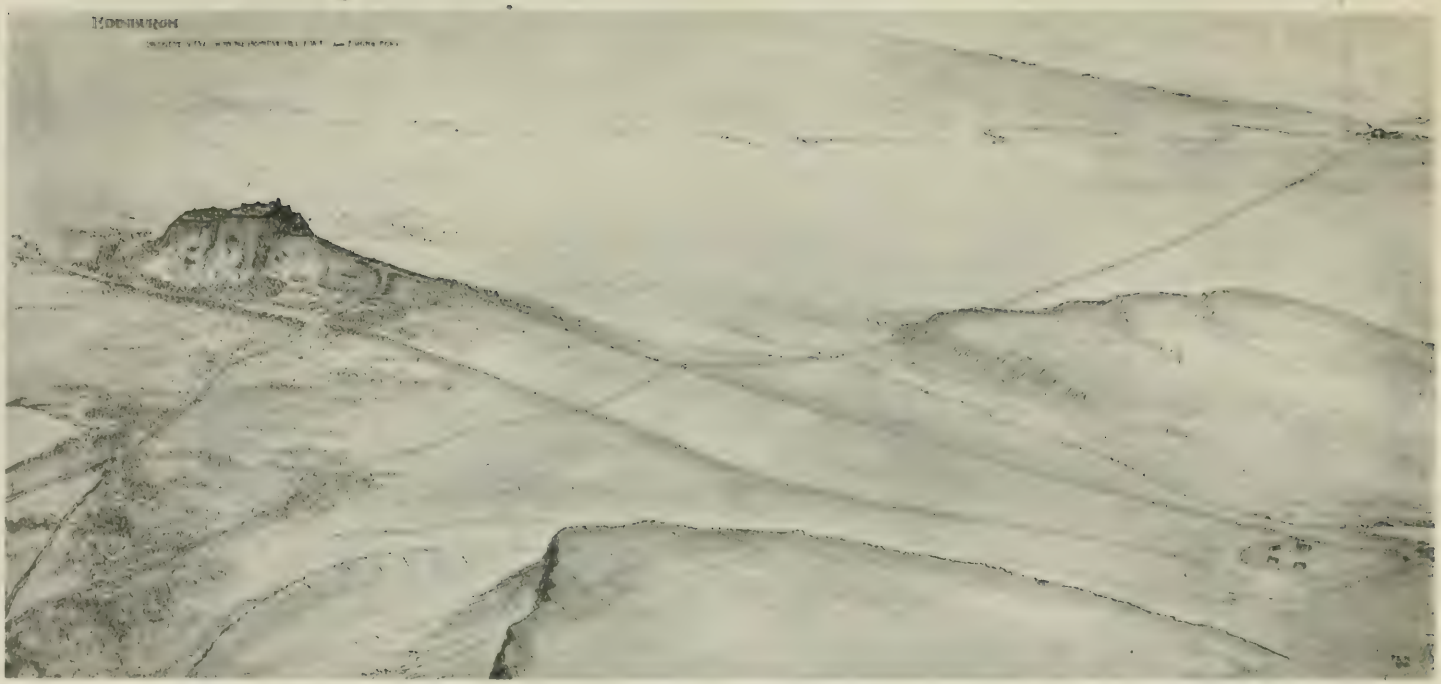


FIG. 8.—Edinburgh in the eleventh century. Bird's-eye view looking NW. from Arthur's Seat. The view shows the Fortress, and its suburb on the ridge: also the early roads and beginnings of Holyrood and Leith.

ing country was a fantastic place of moor, forest, loch, and swamp, with craggy hills rising like islands to the east and south. The beginnings of Dean Village with its mill, of Leith, and of Restalrig can be referred to this period, as also the older Abbey of Holyrood, and the early church settlements on the Forth islands.

At this time most of the refuge forts were being deserted for more hospitable sites, but the Port Castles of Edinburgh—Leith guarding one side of the Ferry, and Dunfermline-Inverkeithing the other, along with the Bridge Castle of Stirling—continued to gain importance as forming a triangle of strength for the control of the Forth Valley, and one or another became temporary capital of the region or of Scotland with the varying calls of war or peace. It was only when the ancient danger of the Northmen was finally overcome, and a new and greater menace threatened from the south, that Edinburgh became the frontier capital of a united Scotland. Her importance in this respect was increased by the open door of the Forth leading direct to the Continent.

The Scottish people were in close touch from early times with their neighbours across the sea, as Wallace's remarkable letter, written from Haddington to the Citizens of Hamburg and Lübeck, bears witness. But it may be said that the final choice of Edinburgh as capital was as much due to the French Alliance as to the strength of her Castle.

The Royal Burgh.

The twelfth and thirteenth centuries may be regarded as the happiest ages in early Scottish history. The documentary evidence for this time has been almost entirely destroyed, but in the lay-out and laws of the burghs, and the remains of the cathedrals and monasteries, we find proof of a period of great prosperity and cultural endeavour. Historians who base their descriptions of Scottish life in this time on Froissart's and other writers' contemptuous accounts, have failed to realise how quickly the land, united and blossoming in the light of a new inspiration of civic life, was ruined by the shocks of successive invasions and wastings.

Those of us who have seen, far behind the line in France, the orchard villages completely destroyed by the retiring Germans, can realise a little what happened time after time in Scotland, for in France the people were at least spared from wholesale massacre. Little wonder that the Scots with tragic pride adopted later the thistle as their emblem: "Nemo me impune lacessit."

The history of twelfth and thirteenth century Scotland remains yet to be written, and here she was happier than England, for the Norman invasion of Scotland was religious and cultural from the beginning, and their system was modified to suit Scottish custom, and followed a milder course throughout.

For a general idea of the policy in trade which led to the founding of the burghs from the twelfth century onwards, the reader must be referred to the *Scottish Historical Review*, October 1915 and January 1916.

The founding of such new towns was one of the most characteristic

features of the time, but they must not be considered alone. The burghs represent only one unit of a threefold one of castle, burgh, and

Fig. 9.—Edinburgh, *circ.* 1460. Bird's-eye view looking west from a point above St. Margaret's Loch. Note the "King's Wall" half way up the southern slope leaving the Cowgate, the enclosures of the Friars, and Kirk-o'-Field undefended.

abbey, and this trinity will be found, no doubt with its parts in varying relative scale, to have been adopted in probably every case (Fig. 9).

The burghs were set out very regularly on new sites around a large central space, which sometimes, as in Edinburgh or Elgin, took rather the form of a wide street. In other cases, such as Haddington or St. Andrews, the space enclosed was triangular or square. When tracing the original spacious lay-out of a burgh, it is necessary to make allowance for the large amount of encroachment which began seriously in the fourteenth or fifteenth centuries, and has continued ever since. Wood's series of plans of one hundred years ago are of great value in this connection, as showing the large amount of public space which has been lost even in that comparatively short time. Encroachments may be recognised by the irregular shape and size of the plots. They are frequently a standardisation of the irregular lines of market booths, whose owners had by some means acquired a right to the piece of ground.

The burghs were in early days as much based on agriculture as on trade and crafts, as is shown, apart from the evidence of their plans, by the large proportion of references to agriculture in the *Laws of the Four Burghs*. This is one of the earliest civic codes in existence, and fortunately has escaped the general destruction of the early Scottish Records. There are many regularly planned villages on the Borders and in the North of England, which have preserved their plan as well as their connection with the land to this day. By comparison with these we can determine very closely the appearance of the burghs, which indeed were originally little larger than many of these villages.

The original plots were long and narrow, at right angles to the central space, and generally opened at the other end on a narrow lane. In very few burghs is there evidence of any system of streets—St. Andrews and Perth, however, are laid out in this way.. The plots within burgh were of one rood at least in area, and were set out with great regularity, and careful provision was made for the settlement of disputes about boundaries.

The burgh laws show that they were cultivated, and in addition there are constant references to difficulties between neighbours in regard to cattle, pigs, sheep, geese, etc., within the burgh.

The Canongate has only lately lost its character as a garden town. Gordon of Rothiemay's view shows it still elaborately gardened in the seventeenth century.

Although probably no original houses remain in any of the Scottish burghs, surviving examples in England and on the Continent, as well as the seventeenth century town plans of Blaeu and others, give us an indication of their character. They were generally framed in wood with plaster or mud-filling, each having its gable to the street, and a large gateway at the side. Gate and corner posts, etc., were elaborately carved, and there was a free use of whitewash and bright colour. This tradition of carved and painted woodwork has survived to our own day in the art of the gypsy van and agricultural wagon builders.

In this connection it is not without interest to note that certain carved stones from old St. Giles', now preserved at Swanston, seem to show that the exterior of the church was originally whitewashed. The early castle was undoubtedly "harled," as are many of the finest Scot-

tish castles to-day. Thus "Auld Reekie" was a very different town in its early days—castle and burgh and abbey all alike clean and shining; as new and practical in the eyes of their builders as Rosyth is to us to-day, but with an added quality of ordered civic idealism, which is now only being recovered in part in our modern garden villages.

The burgh and abbey were self-contained units just as the castle was, each having its enclosing fence or wall and ports, and the duties and privileges of the dwellers in each were very clearly defined.

The new burgh of Edinburgh was laid out along the crown of the ridge, and first extended from Castlehill to a point a little east of the Bridges. The long closes ran down the slope on each side to back lanes, of which only the Cowgate on the south remains. The closes on the south of the Cowgate appear to belong to this original setting out, and the King's Wall represents a shrinkage of the town for military reasons; as happened later in Berwick, where the existing fortifications are far within the line of the Edwardian walls.

The Grassmarket was regularised at this time, and appears to have been originally about two-thirds of its present length.

Both the High Street and the Grassmarket must have been originally grass-grown, as are the central spaces of country villages to-day.

Limit of space in this short paper do not permit of a detailed analysis of the structure and organisation of the burgh in its early period: the subject is full of interest, and not without its pointed lessons for the present day.

It is one of the tragic results of mediæval wars and recent utilitarianism that this ancient garden town and capital of Scotland should have come to be labelled as a slum, and it is maintained that only by an understanding of its early character can its present state of squalor be remedied in such a way as to prevent that relapse which has followed too many improvement schemes in the past. But the Civic Survey leads us further than this: it brings to us the vision of the ancient hill-city renewed, not as an improved slum, but as the vital centre of the city's life.

THE EARLY VIEWS AND MAPS OF EDINBURGH.

By William Cowan and Harry R. G. Inglis, F.R.S.G.S.

The earliest known fairly authentic representation of Edinburgh is a picture plan (A), illustrating an attack on the city, believed to be that under the Earl of Hertford in 1544, when the greater part of the town was burnt by the English troops. The city then consisted of two main streets—the High Street with its continuation the Canongate; and the Cowgate widening out into the Grassmarket. An interesting feature of this picture is that the roofs of the houses from the Castle to the Netherbow are coloured red, while those in the Canongate and outside the city walls are coloured grey. The suggestion is that the former were mostly tiled buildings, while the latter were thatched or slated. This plan has all the appearance of being a carefully drawn original.

Following this appears the absurd View of Edinburgh (B), inserted in Münster's *Cosmographia*, dated 1550. It is said to be from a description by Alesius—a Scottish Professor in Germany—but as the picture is not uniform with the rest of the illustrations in Münster's volume, and bears the initials "RMD" at the right-hand side—which initials are not found elsewhere in the work—there is the possibility that it is a picture borrowed from some obscure volume now unknown. The picture is more amusing than reliable.

The next in chronological order—the scene of the murder of Darnley—(C), while not in itself a picture of the city, gives some idea of the general appearance of the buildings in Edinburgh in 1567. Most noticeable is the predominance of the crow-stepped gable walls of the period, as well as the outside stairs, which can still be seen in older buildings to-day. The picture is evidently not meant to be taken as a consistent whole, as the relative positions of the various buildings are not in accordance with fact.

Next in order is what is believed to be a reproduction of a sketch made to illustrate an account of the siege of the Castle in 1573 (D), when the latter was held for Mary Queen of Scots by Sir Wm. Kirkaldy of Grange, and attacked by English troops under Sir Wm. Drury. The sketch was published in Holinshed's *Chronicle*, 1577, and is apparently the basis from which the two following pictures were made up.

Of the undated view of Edinburgh (E), published in a collection of "Views of the Principal Cities of the World," by G. Braun and F. Hogenburg in Holland about 1580, it is difficult to speak with certainty. As a source of information it is of no value, being apparently compiled from hearsay description and not from actual knowledge, while in some respects it bears a great family resemblance to the previous picture. It has been frequently reproduced.

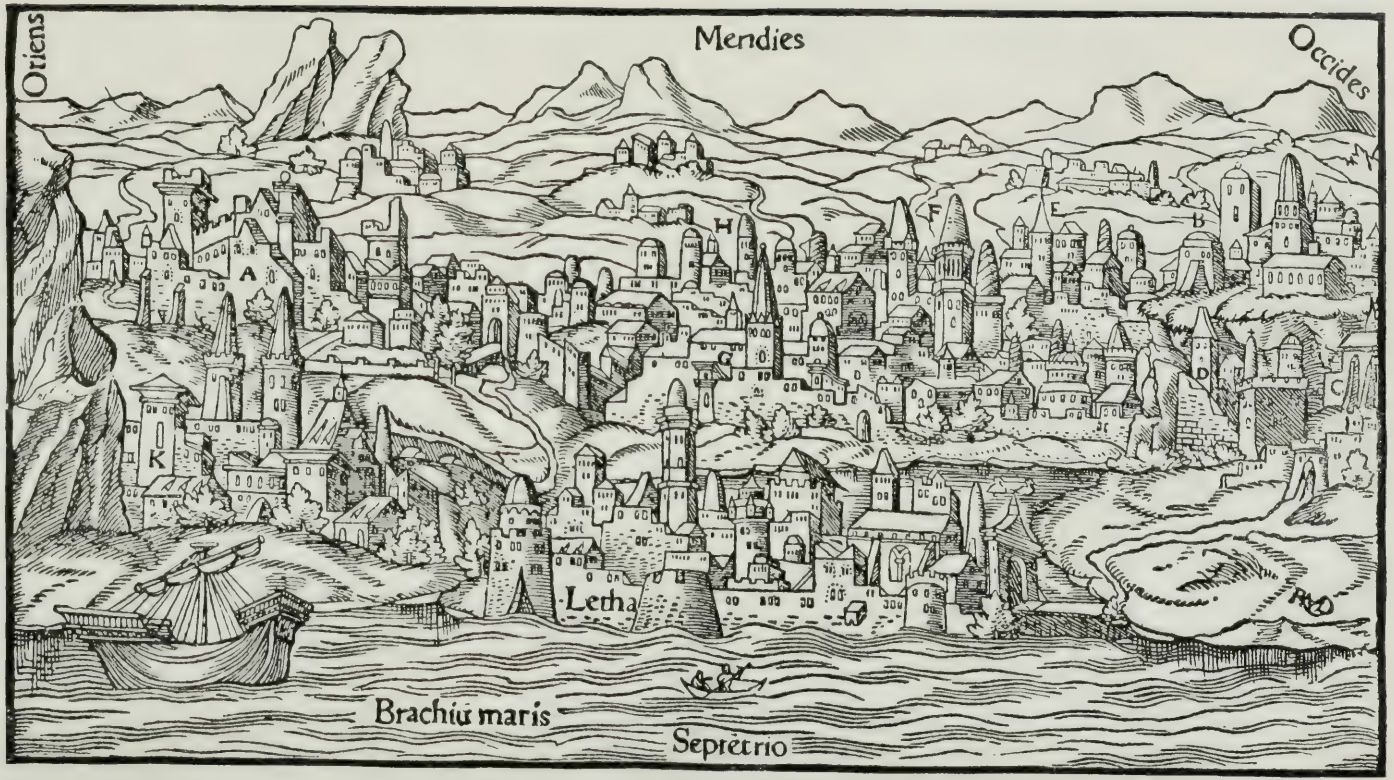
A small copy (F), from Braun and Hogenburg's view, embellished with the picture of a man with swords and "S's" issuing from his mouth, is evidently from a German source. From the discourse about anger, it looks as if it were out of some book of moral maxims. It will be obliging if any one can state in what book the picture appears, and at what date.

The double picture of the city by Gordon of Rothiemay (G), was drawn to accompany his picture plan of Edinburgh drawn in 1647, and is here given as probably the first really good picture of Edinburgh. It is unfortunate that it cannot be absolutely trusted in some respects, as Gordon complains that the engraver, by enlarging the views, had falsified the same. This would appear to mean that the proportions of the buildings were not absolutely as in the original sketches.

Shortly after the issue of these two views, Hollar, the famous engraver, issued a picture of Edinburgh from the south (H), which has been much admired. The plate is dated 1670, but the drawing was probably made some years earlier, as certain buildings are shown which were destroyed by Cromwell in 1650.

The last of the pictures reproduced (I), is more of a curio than an authentic view. The print was published in Paris probably about the

A 1544. The earliest known fairly authentic view of Edinburgh.



B 1550. From Münster's *Cosmographia*.

A Palatium Regis.
K Monasterium S. Crucis.
H Predicatores.
G Collegium Reginae.
F Ecclesia beatae Mariae in Campo.
E Minoritae.
B Arx Puellarum.
D Ecclesia S. Egidii.
C Ecclesia S. Cuthbert.

end of the eighteenth century, but from its appearance the view must be of much earlier date, and most of the details are highly imaginary. It will be observed that if the picture is held up to the light and looked at through the back, the positions of some of the buildings and places depicted become rather more intelligible, and it is possible the original engraver had neglected to reverse the picture.

Fuller bibliographical and other information as to the early views of Edinburgh will be found in a paper by William Cowan in Vol. IX. of the Publications of the Edinburgh Bibliographical Society.

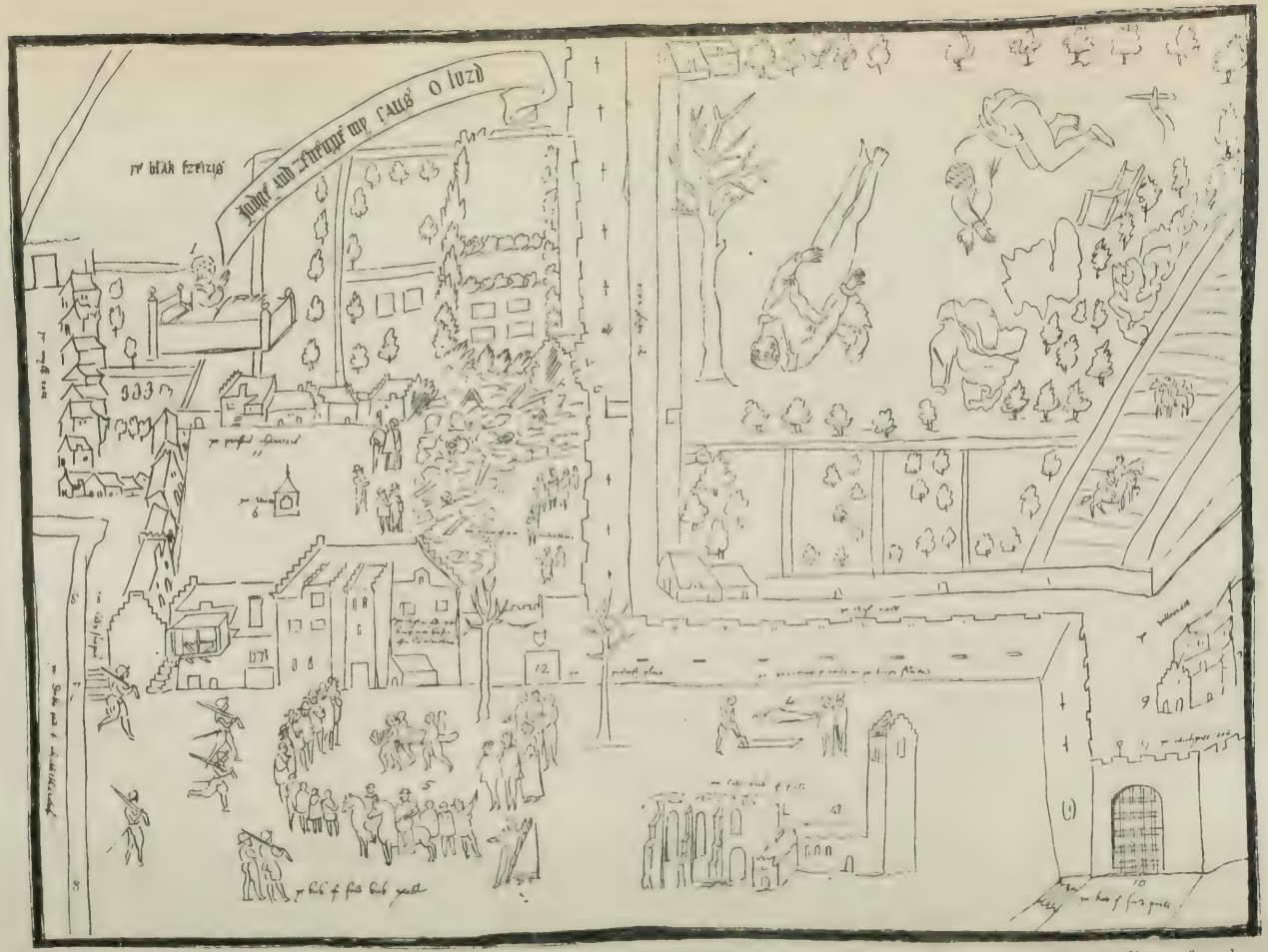
When we come to the actual plans of the city, the first of real merit is Gordon of Rothiemay's map (No. 1), surveyed by the assistance and direction of the Town Council in 1647, and of its quality nothing but the highest praise can be given. The features that impress the eye most are the closely packed buildings of the High Street and Cowgate, and the spaciously laid out gardens of the Canongate residences. There are quite a number of reproductions of this plan with slight variations. It was originally engraved by De Wit in Holland *circ.* 1647, and was re-engraved by Andrew Johnston in London about 1710, and this plate was re-issued by Joseph Smith in 1719, and again by John Bowles in 1819. The two last appeared in Slezer's *Theatrum Scotiae.*

Practically a hundred years elapsed before the next survey was undertaken. It seems curious that Adair, with all his geographical skill, never appears to have attempted to make a plan of the city during his residence there, when he was making his County maps of the district. No doubt he would be influenced in this by his animosity to Slezer, who, in 1693, produced views of Edinburgh from various points. In 1742, however, a survey of the city was made by William Edgar, whose plan was published in Maitland's *History of Edinburgh*, 1753. After his survey of Edinburgh, Edgar made one of Dumbartonshire, then of Stirlingshire, followed by Perthshire, when he was drafted into Government service to prepare the maps of the roads through the Highlands to Inverness, the manuscripts of which are in the British Museum. It is stated that he died as the result of the exposure in surveying.

Not long after the '45, a movement towards city improvement was set on foot, the first result of which was the building in the High Street of the Exchange, now the City Chambers. Much more important, however, was the project of an enlargement of the city, by the acquisition of the fields beyond the Nor' Loch, and the erection thereon of a New Town. The first great step towards the realisation of this scheme was the construction of the North Bridge, which was begun in 1763 (but not completed till 1775). At this time Edgar's map was brought up to date and issued in 1765.

It will be observed that, up to this point, only two really satisfactory plans of Edinburgh had ever been published, but from this time onward these began to be issued in profusion, and as it would be tedious to go into the details of the very numerous maps issued, attention need only be given to those of outstanding importance.

In 1767 Craig presented his Plan of the New Town to the Town Council, and, although a later plan was made showing a great "circus"



C 1567. Left: The scene of the murder of Darnley after the explosion at Kirk-o'-Field. Right: The position of the bodies as found. Foot: Burying the servant and carrying away the King's body.

in the middle of George Street (originals in the Municipal Museum), the first scheme was adhered to in the main.

Various small plans were produced shortly after 1767, but the best and most detailed larger plans were those of Ainslie 1780, and Kincaid 1784. Ainslie as a surveyor had begun with Jedburgh, but his fine work was appreciated, and for the next twenty to thirty years he was one of the leading geographers of the day. As there is no great difference between his map and that by Kincaid, the former is reproduced.

The Edinburgh Directory, which was first issued in 1773, soon became an annual publication; and the small maps issued in it, as well as in the Guide Books which came into being about the same period, had few special features of their own, as they were almost entirely copied from the larger maps. In tracing the history of these publications at this period and even at a later date, it is frequently difficult to be quite definite, as the majority of these early Directories now available have had the maps torn out, and we are never certain whether some later possessor has not inserted some other available map in its place. It is this fact that creates a difficulty in tabulating these plans, as different copies of the same Directory have been found to have different maps.

In 1804 Ainslie engraved an entirely new map, giving the suburbs, as well as the names of the proprietors of the various properties. The map is extremely useful in verifying the boundaries of old properties.

During the next twelve years the issue of maps was practically confined to those of small size for the general purposes just referred to, and the same plan was made use of in different publications subject to slight alterations and changes in the title and imprint.

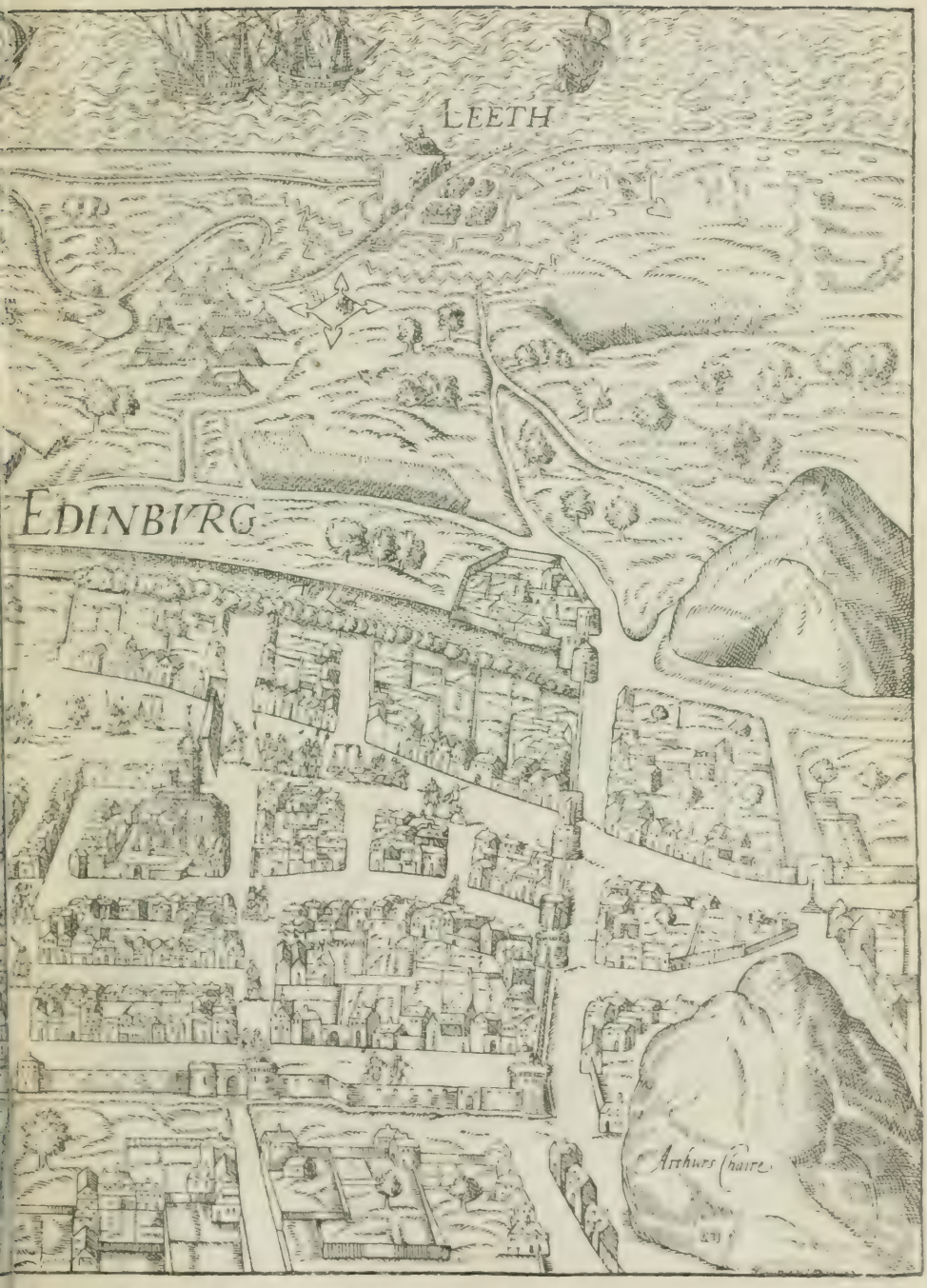
In 1817 Kirkwood issued his splendid large map, almost entirely superseding Ainslie's map of 1804. This map is *par excellence* the finest plan of Edinburgh of the early part of the nineteenth century; and as it includes a large part of the ground now covered by the suburbs, it is a most useful work for purposes of consultation.

Kirkwood followed this in 1819 by a pictorial plan of the New Town, where we have a beautifully engraved picture of each street, showing the appearance of every building, while the coaching, timber, and farm yards that appear at various points are in themselves interesting studies of detail.

Quickly following these came Knox's plan of 1821—of handier size—and this map was re-issued in 1823 and 1825, when Lothian's similar map appeared, reprinted in 1829, 1831, and again in 1844, with Laing and Forbes' imprint. This map is of interest to the present generation, as it was engraved by George Bartholomew, the ancestor of the head of one of our best known engraving firms. It is also of interest because it shows the original design for laying out the London Road district, a project that was never carried out—one of those splendid town-planning schemes that somehow fail to materialise.

The Directory Maps at this period show continuous improvement, and various different maps were tried, but in 1834 Lizars issued a new map (dated), and this was used uninterruptedly till 1859, when W. & A. K. Johnston obtained the contract. It is unfortunate that

D 1573. Siege of Edinburgh Castle by English Troops. Cas



efended by Kirkaldy of Grange on behalf of Mary Queen of Scots.

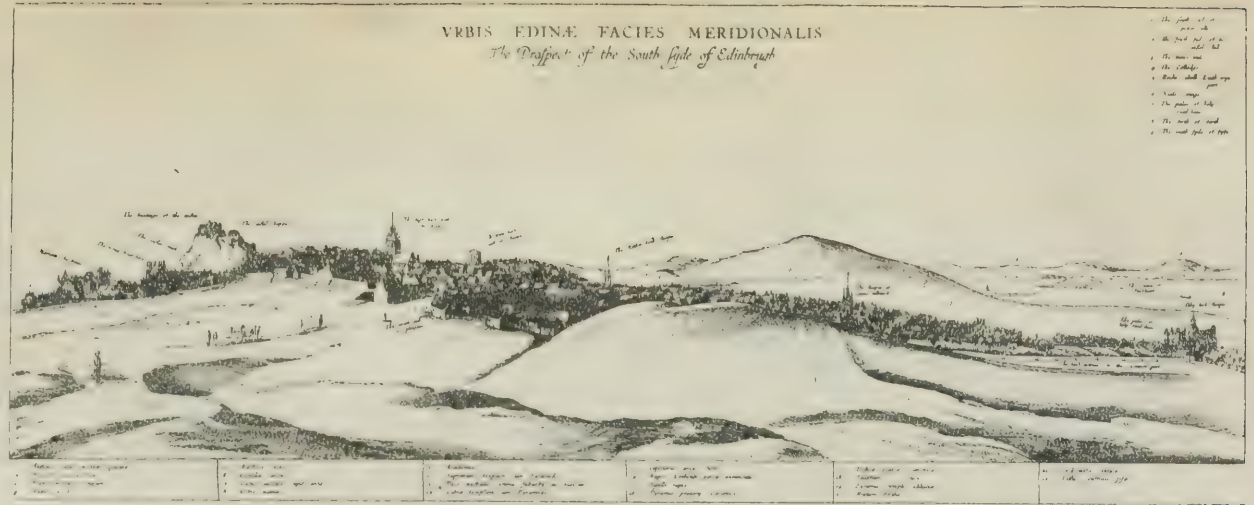
E *Cir.* 1582. In Braun and Hogenburg's "Civitates Orbis Terrarum." Appears to be worked up from the picture in Holinshed's *Chronicle*.

Ira furor brevis est, ingrescunt sanguine venæ, Littera serpentis triplicatur et arma ministrat.

Auß zorn der Alexander groß
Seins freundes Cliti blut vergoß:

Ein zorniger thut nichts zu mahl,
Außspeyen dann S.S. on zahl.

F Evidently a small copy of the previous view Source unknown.



G 1647. By Gordon of Rothiemay to accompany his Plan.

H 1670. Hollar's Picture of Edinburgh from the south.

I Eighteenth Century Picture of Edinburgh. Published at Paris.

after 1836 Lizars' maps are undated, and that for some years the same map appears, almost without change, in later issues. Without doubt the explanation is, that Lizars printed a very large edition—far more than could be used in one year—and when these were used up, a fresh batch was printed. In no other way can we account for the fact that different maps appear in different copies of the same year's Directory, and for the long periods elapsing between the correction of the plate. The outstanding feature by which each batch can be recognised is:—1841, Haymarket Terminus added; 1843, Newhaven Railway; 1845, North British Railway; 1847, Scotland Street Tunnel; 1850, Granton Railway; 1852, Caledonian Station added; 1857, Cockburn Street marked.

These Directory Maps practically held the field for twenty years, until Lancefield, with the encouragement of W. & A. K. Johnston, completed his survey of Edinburgh in 1851, notwithstanding the fact that the Ordnance Survey was on the point of being issued. This map was a most exquisite and fine piece of private engraving work.

As the Ordnance Survey of 1852 became the official map from that time forward, it is reproduced as being what may be called the first official map of the city.

As it is possible that there are other maps of Edinburgh than those in this list, a communication should be sent to Mr. Cowan or Mr. Inglis by any one knowing of other pre-railway period maps.

An index of sizes is given below as it is not always possible to identify undated or torn maps. The index of names on p. 327, gives those which appear on the maps, whether of surveyor, publisher, or engraver. Where no name appears on a map reference should be made to the index of sizes, from which almost any pre-railway map can be identified. Maps after 1847 can be recognised by the North British and Caledonian Railways being marked on them. Owing to the stretch or shrinkage of different papers, the measurements are only approximate.

APPROXIMATE SIZES OF THE MAPS OF EDINBURGH.

57 × 63	Kirkwood	34	1817
51 × 66	Lancefield	99	1851
31 × 44	Ainslie	22	1804
30 × 37½	Kincaid	12	1784
26½ × 44	Kirkwood	36	1819
23½ × 30½	,,	42	1821
24 × 25⅞	Gardner	64	1832
19 × 24	Knox	41, etc.	1821-1836
18⅞ × 19½	Johnston	68	1834
18¼ × 22⅞	Brown	44.60	1823-1831
18 × 22½	Lothian	48.86	1825-1844
18 × 22½	City Improvements	59	1830?
18 × 22½	Ainslie	11	1780
17⅜ × 23	Gellatly	88	1845
16½ × 40½	Gordon	1	1647
16½ × 18½	Knox	30	1812
16 × 21½	Lizars	72, etc.	1835-1859
16 × 20½	Johnston	76	1836
15⅞ × 25½	Craig	6	1768
15⅝ × 23	Brown	15	1793
15½ × 20	Johnston	66.67.71	1833-35
15½ × 19⅜	Scott	29.32.47 54.94	1809-1824 1828-1848
14½ × 18	Aikman	57	1829
13⅜ × 17	Lizars	50, etc.	1825-1830
13⅜ × 17	Lizars	10.14	1778-1787
13½ × 19½	Faden	9	1773
11¾ × 23½	Edgar	3.4	1742-1765
11⅝ × 15½	Clarke	69	1834
11½ × 14	Kirkwood	89	1845
11½ × 14	Hunter	74	1836
10⅝ × 14¾	Black	93	1847
10½ × 13½	Anonymous	26.27.28	1807-1809
9 × 12	Dassauville	38.46	1820-24
9 × 10½	Lizars	62.65	1832-33
9 × 9⅜	Lizars	61	1831
8 × 10¼	Dassauville	25	1806
7⅞ × 8⅝	M'Laren	33.39	1817-1820
7½ × 10¼	Denovan	23.24.27	1804-8
7½ × 10¼	Lizars	31.35	1812-1818
7 × 11	Anonymous	7	1771
7 × 11½	Anonymous	5	*cir.* 1767
6⅝ × 9	Pinnock (in black)	73	1835
6 × 10	M'Intyre	16.18.20	1793-99
6 × 10	Gavin	13.17	1787-1794
6 × 8⅝	M'Laren	19.21	1797-1820
5½ × 9½	Storer	40	1820

CHRONOLOGICAL LIST OF MAPS OF EDINBURGH

PRIOR TO THE ORDNANCE SURVEY.

Small type, below 12 × 15 ; SMALL CAPITALS, 12 × 15—20 × 25 ; CAPITALS, above 20 × 30.

1	1647	GORDON	Picture Plan	50	1825	LIZARS †	in P. O. Directory
2	c1730	...	Hospital Lands	51	1826	,,	,,
3	1742	EDGAR	First City Plan	52	1827	,,	,,
4	1765	,,	Revision	53	1828	,,	,,
5	c1767	Anonymous		54	1828	HUNTER &	SMITH (Map 29)
6	1768	CRAIG	Plan of New Town	55	1829	LOTHIAN	
7	1771	Anonymous		56	1829	THOMSON	in P. O. Directory
8	1773	ARMSTRONG	on Map of Lothians	57	1829	AIKMAN	in Mackie's Holyrood
9	1773	FADEN &	JEFFERY	58	1830	THOMSON	in P. O. Directory
10	1778	D. LIZARS	in Arnot's History	59	c1830	LIZARS	City Improvements
11	1780	AINSLIE		60	1831	BROWN &	NELSON
12	1784	KINCAID		61	1831	Lizars	in P. O. Directory
13	1787	Gavin	in Kincaid's History	62	1832	,,	,,
14	1787	D. LIZARS	in Arnot's History	63	1832	KNOX	in Roll of Voters
15	1793	BROWN &	WATSON	64	1832	GARDNER	in Parliamentary Report Burghs
16	1793	M'Intyre	in Aitcheson's Directory	65	1833	Lizars	in P. O. Directory
,,	1794	,,		66	1833	JOHNSTON	in Gray's Directory
17	1794	Gavin	in Traveller's Companion	67	1834	,,	,,
18	1796	M'Intyre	in Aitcheson's Directory	68	1834	,,	in Pollock's Guide
19	1797	M'Laren	in Brown's Guide	69	1834	CLARKE	Turrell—Chapman & Hall
20	1799	M'Intyre	in Aitcheson's Directory	70	1834	LIZARS	in P. O. Directory
				71	1835	JOHNSTON	in Gray's Directory
21	1800	M'Laren	in Brown's Guide	72	1835	LIZARS	in P. O. Directory
22	1804	AINSLIE		73	1835	Pinnock	printed in black, letters white
23	1804	Denovan	in Directory (Lizars)				
24	1806	,,	in New Picture of Edinburgh	74	1836	Hunter	
				75	1836	KNOX	in Stark's Picture
25	1806	Dassauville	in Stark's Picture	76	1836	JOHNSTON	
26	1807	Anonymous	in P.O. Directory	77	1837	LIZARS	in Directory
27	1808	,,	,,	78	1838	,,	,,
28	1809	,,	,,	79	1839	,,	in P. O. Directory
29	1809	SCOTT	in Stranger's Guide	80	1840	,,	,,
30	1812	KNOX	in Map of Midlothian	81	1841	,,	in M'Dowell's Guide
31	1812	D. Lizars	in New Picture of Edinburgh	82	1841	,,	in P. O. Directory
				83	1842	,,	,,
32	1816	SCOTT	in Arnot's History	84	1843	,,	,,
33	1817	M'Laren	in Brown's Guide	85	1844	,,	,,
34	1817	KIRKWOOD	the Best Large-Scale Map	86	1844	LAING & FORBES	
35	1818	Lizars	in New Picture	87	1845	LIZARS	in P. O. Directory
36	1819	KIRKWOOD	Picture Plan	88	1845	GELLATLY	in Milne's Plan
				89	1845	Kirkwood	
37	1820	(SCOTT)	in Stark's Picture	90	1846	Lizars	in Rhind's Guide
38	1820	Dassauville		91	1846	LIZARS	in P. O. Directory
39	1820	M'Laren	in Brown's Guide	92	1847	,,	,,
40	1820	Storer	2 small Sheets N. & S	93	1847	Black	
41	1821	KNOX	engraved by Scott	94	1848	PATON	in Wilson's Memorials
42	1821	KIRKWOOD	centre sheet of 1817	95	1848	LIZARS	in P. O. Directory
43	1822	THOMSON		96	1849	,,	,,
44	1823	BROWN	revised by Wood	97	1850	,,	,,
45	1823	KNOX	in Stark's Picture	98	1851	,,	,,
46	1824	Anderson	in Directory	99	1851	LANCEFIELD	by W. & A. K. Johnston
47	1824	WAUGH &	INNES (Map 29)				
48	1825	LOTHIAN *		100	1852	LIZARS	in P. O. Directory
49	1825	KNOX	in Stark's Picture	101	1852	ORDNANCE SURVEY	

* Drawn and engraved by George Bartholomew, 1825.

† Drawn and engraved by John Bartholomew, 1825. Subsequent editions revised and corrected by John Bartholomew, father and son.

ALPHABETICAL INDEX OF NAMES.

	Anonymous Maps	2.5.7.26.	27.28.37
57	Aikman	1829	14½ × 18
11	Ainslie	1780	18 × 22¼
22	,,	1804	31 × 44
	Aitcheson 16.18.20		
46	Anderson	1824	9 × 12
8	Armstrong	1773	13 × 17½
	Arnot's History 10. 14.32		
93	Black	1847	10⅜ × 14¼
	Brown's Guide 19. 21.33.39		
15	Brown and Watson	1793	15⅞ × 23
44	Brown-Wood	1823	18½ × 22⅜
60	Brown and Nelson	1831	18½ × 22⅜
59	City Improvements	1830?	18 × 22¼
69	Clarke	1834	11¾ × 15¾
6	Craig	1768	15½ × 25½
25	Dassauville	1806	8 × 10¼
38	,,	1820	9 × 12
23	Denovan (Lizars)	1804	7½ × 10¼
24	,, ,,	1806	,,
31	,, ,,	1812	,,
35	,, ,,	1818	,,
1	De Wit	1647	16½ × 40½
3	Edgar	1742	11⅜ × 23½
4	,,	1765	,,
9	Faden	1773	13⅛ × 19¼
64	Gardner	1832	24 × 25⅜
13	Gavin	1787	6 × 10
17	,,	1794	,,
88	Gellatly	1845	17⅜ × 23
1	Gordon	1647	16½ × 40½
46	Hunter	1824	9 × 12
54	,,	1828	15½ × 19⅜
74	,,	1836	11½ × 14
66	Johnston	1833	15½ × 20
67	,,	1834	,,
68	,,	1834	18¾ × 19½
71	,,	1835	15½ × 20
76	,,	1836	16 × 20½
99	,,	1851	52 × 67
12	Kincaid	1784	30 × 37½
34	Kirkwood	1817	57 × 63
36	,,	1819	26½ × 44
42	,,	1821	23½ × 30½
89	,,	1845	11½ × 14
30	Knox	1812	16½ × 18½
41	,,	1821	19 × 24
45	,,	1823	,,
49	,,	1825	,,
63	,,	1832	,,
75	,,	1836	,,
86	Laing and Forbes	1844	18 × 22¼
99	Lancefield	1851	52 × 67
10	Lizars	1778	13 × 17½
14	,,	1787	,,
23	,,	1804	7½ × 10¼
24	,,	1806	7½ × 10¼
31	,,	1812	7½ × 10¼
35	,,	1818	7½ × 10¼
50	Lizars	1825	13⅜ × 17
51	,,	1826	,,
52	,,	1827	,,
53	,,	1828	,,
56	,, (Thomson)	1829	,,
58	,, ,,	1830	,,
59	,,	1830?	18 × 22¼
61	,,	1831	9 × 9⅞
62	,,	1832	9 × 10½
65	,,	1833	9 × 9⅜
70	,,	1834	16 × 21½
72	,,	1835	,,
77	,,	1837	,,
78	,,	1838	,,
79	,,	1839	,,
80	,,	1840	,,
81	,,	1841	9 × 9⅜
82	,,	1841	16 × 21½
83	,,	1842	,,
84	,,	1843	,,
85	,,	1844	,,
87	,,	1845	,,
90	,,	1846	8½ × 10½
91	,,	1846	16 × 21½
92	,,	1847	,,
95	,,	1848	,,
96	,,	1849	,,
97	,,	1850	,,
98	,,	1851	,,
100	,,	1852	,,
48	Lothian	1825	18½ × 22¾
55	,,	1829	,,
60	,, (Brown)	1831	,,
86	,, (Laing)	1844	,,
16	M'Intyre	1793	6 × 10
18	,,	1796	,,
20	,,	1799	,,
19	M'Laren	1797	6 × 8⅜
21	,,	1800	,,
33	,,	1817	7½ × 8⅜
39	,,	1820	,,
101	Ordnance Survey	1852	—
94	Paton	1848	15½ × 19¾
73	Pinnock	1835	6¾ × 8⅞
68	Pollock	1834	18¾ × 19½
29	Scott	1809	15½ × 19¾
32	,,	1816	,,
37	(,,)	1820	,,
47	,,	1824	,,
	Stark 25.	37.45.49	75
40	Storer	1820	14½ × 9⅜ / 15½
43	Thomson	1822	15¼ × 19½
44	,, (Brown)	1823	18¾ × 22⅜
56	,, (Lizars' Map)	1829	14 × 17½
69	Turrell	1834	11⅜ × 15¼
47	Waugh and Innes	1824	15½ × 19⅞
15	Watson	1793	15⅞ × 23
44	Wood	1823	18¼ × 22⅜

THE "EDINBURGH" NUMBER: AN EDITORIAL EPILOGUE.

Owing to the liberality of the Committee for the National Collection of Old Maps of Scotland, and especially of its Convener, Dr. J. G. Bartholomew, we are able to present to our members this special number, with its long series of maps and plans.

To the generosity of Dr. Bartholomew the Society is indebted for the beautiful coloured map, showing the growth and development of the City, which forms the Frontispiece. Mr. Harry R. G. Inglis has undertaken the laborious task of supervising the reproduction of the early maps and plans, and, in collaboration with Mr. William Cowan, has furnished bibliographical material in regard to them. To both the warm thanks of the Society are due, for both, in the midst of manifold activities, have spared neither time nor labour. Mr. Cowan has most generously placed at the disposal of the Editors not only his collection of books and maps, but his unrivalled knowledge of the early representations of the City of Edinburgh. A tribute must also be paid to Mr. A. O. Curle, of the Royal Scottish Museum; to the authorities at the Advocates and Public Libraries; to the Town Clerk and those in charge at the Corporation Museum: without the courteous assistance of these gentlemen, the issue of the number would have been impossible.

The historical presentation, as expressed in the maps and plans, is supplemented by Mr. F. C. Mears, who carries the story back to the period for which no documents are available, and shows how much can be deduced from the study of the remnants of past conditions which still persist through all the centuries of change.

To leave our subject there, however, would be to seem to accept the view that geography is but a handmaid in the temple of knowledge, and has herself no part to play in the work of construction. Since we feel that it is supremely important to combat by all means in our power a view which denies to the geographer the joy of creation, we have placed first in the issue the article by Professor Geddes. The aim of this is to prove that it is only in the analysis of the past that we can find guidance for the future, and that the laborious task of this analysis is more than justified by the vision which it brings of the ceaseless action and reaction between man and his surroundings. The old cultivation terraces in the King's Park; the steep slopes of our streets; the beauties and defects of our northern capital; the very characteristics of its people—all have their roots deep in past history, and deeper still in the permanency of geographical conditions, in relief, in climate, in soil, in local and world relations.

The objects of this special issue are thus multiple. First, and most immediately practical, it is an attempt to justify our existence as a national Geographical Society.

There is at present, as a natural revulsion from the idealism of the early months of the war, and as an inevitable result of the strain of its apparently interminable length, a tendency to concentrate upon the material. To many it appears that the building of the New World

is but a matter of bricks and mortar, and that knowledge, which failed so dismally to prevent the catastrophe, can play but little part in the erection of that which is to be. Our Society, like all learned bodies, is already suffering from the resultant strain, and may be destined to suffer still more. In a sense, therefore, we seek first in this issue to make an appeal not only to our own members, but to Scotland at large, and to the yet wider public beyond, for that support without which continued and extended activity is impossible. We feel, however, that a mere appeal for extended membership, without indication of the justification for that appeal, is insufficient; we are endeavouring, therefore, to justify our existence by showing that there is work to be done which this Society—and it alone—can perform adequately.

It is obvious, in the first place, that the lines of investigation which Dr. Bartholomew and Captain Mears—each in his own way—have pursued here for Edinburgh can be followed up by others for the various cities and districts of Scotland. Here is work waiting for the worker, and here a strengthened Geographical Society could render efficient help.

But those with the special training required for this kind of research must necessarily be few, and our appeal is therefore wider. The aims of the Committee for the National Collection of Old Maps of Scotland can scarcely fail to attract the large public who have a keen interest in antiquarian research. The aims of that Committee are set forth both in this number and in leaflets issued to the members, and those aims can only be successfully pursued in collaboration with the Royal Scottish Geographical Society.

Again, that peculiarly modern mode of studying towns which depends upon a detailed examination of site and of local and world relations, affords a glimpse into one of the most interesting aspects of geography. There must be many, with no detailed acquaintance with the new developments of that subject, able to appreciate the fact that here it touches everyday life closely. To all such we claim that we have a message which no other body is capable of delivering.

The subjects discussed by Prof. Geddes, indeed, come, in some of their aspects, within the reach of the widest public of all. Prof. Geddes has just been requested by the International Zionist Commission to co-operate in the planning of the New Jerusalem and its University—and it is not only in Palestine that the New Jerusalem has to be built.

The Society proposes to initiate in the autumn a campaign with the object of obtaining that extension of membership without which, under the new conditions, it is impossible even to maintain its activities at their pre-war level; far less to increase them. Before starting our campaign we are endeavouring in this issue to indicate some of the possibilities of usefulness which lie before us, if the necessary support be given. It is, we believe, in entire harmony with the new spirit, the spirit which sees a deeper sacredness in nationality since its fierce struggle for existence, that our programme of work should emphasise the beauty and interest of local place relations.

CONTENTS

Frontispiece.—Chronological Map of Edinburgh, showing Expansion of the City from Earliest Times to the Present. By J. G. Bartholomew, LL.D.

Beginnings of a Survey of Edinburgh. By Professor P. Geddes, Outlook Tower. *With Illustrations.*

Primitive Edinburgh. By F. C. Mears, Captain R.A.F., Architect. *With Illustrations by the Author.*

The Early Views and Maps of Edinburgh. With Table of Sizes, Chronological List of Maps, and Alphabetical List of Names. By William Cowan and Harry R. G. Inglis, F.R.S.G.S.

The "Edinburgh Number": an Editorial Epilogue.

REPRODUCTIONS OF VIEWS AND MAPS OF EARLY EDINBURGH.

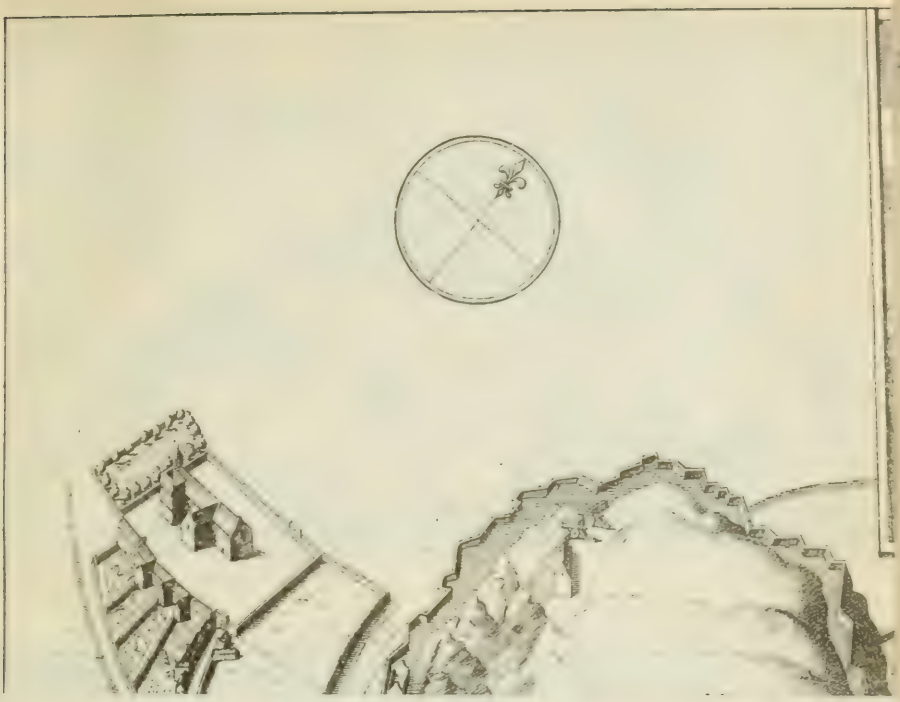
Views.

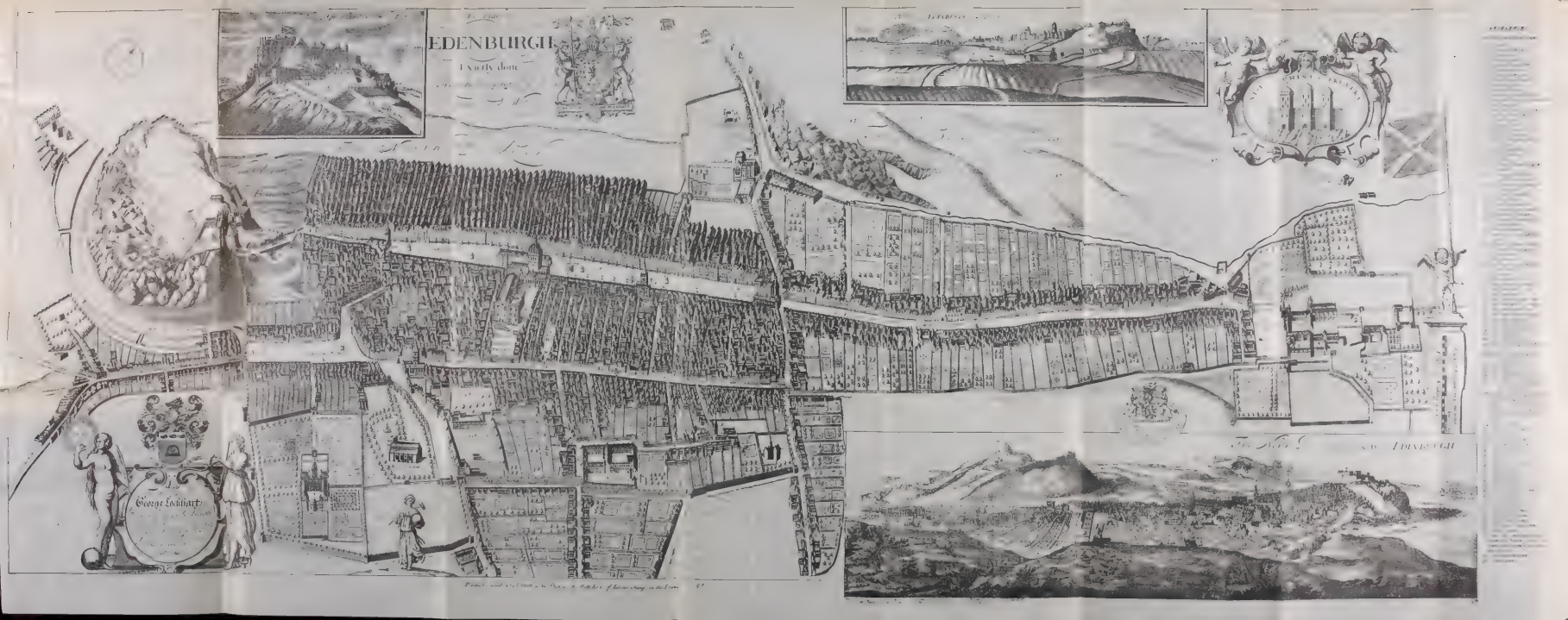
A. Attack on Edinburgh. 1544.
B. View of Edinburgh. 1550.
C. The Murder of Darnley. 1567.
D. Siege of the Castle. 1573.
E. View of Edinburgh. *Circ.* 1580.
F. German Copy of Above. Date unknown.
G. Gordon of Rothiemay's Picture of Edinburgh. 1647.
H. Hollar's Picture of Edinburgh. 1670 (?)
I. Eighteenth Century Picture of Edinburgh, published at Paris.

Maps.

1. Gordon of Rothiemay's Map, . . 1647
2. Corporation Plan, ... 1730?
3. Anonymous Map, ... 1767?
4. Edgar's First City Plan, . . . 1742
5. Edgar's Revised Plan, . . . 1765
6. Ainslie's First Plan, ... 1780
7. Ainslie's Second Plan, . . . 1804
8. Lothian's Plan, ... 1825
9. Ordnance Survey, ... 1852
10. Craig's Plan of the New Town, . . 1767

As the Distance from Holyrood Palace entrance to the centre of the Castle Esplanade is one mile, the scale of any Map of Edinburgh can easily be found.



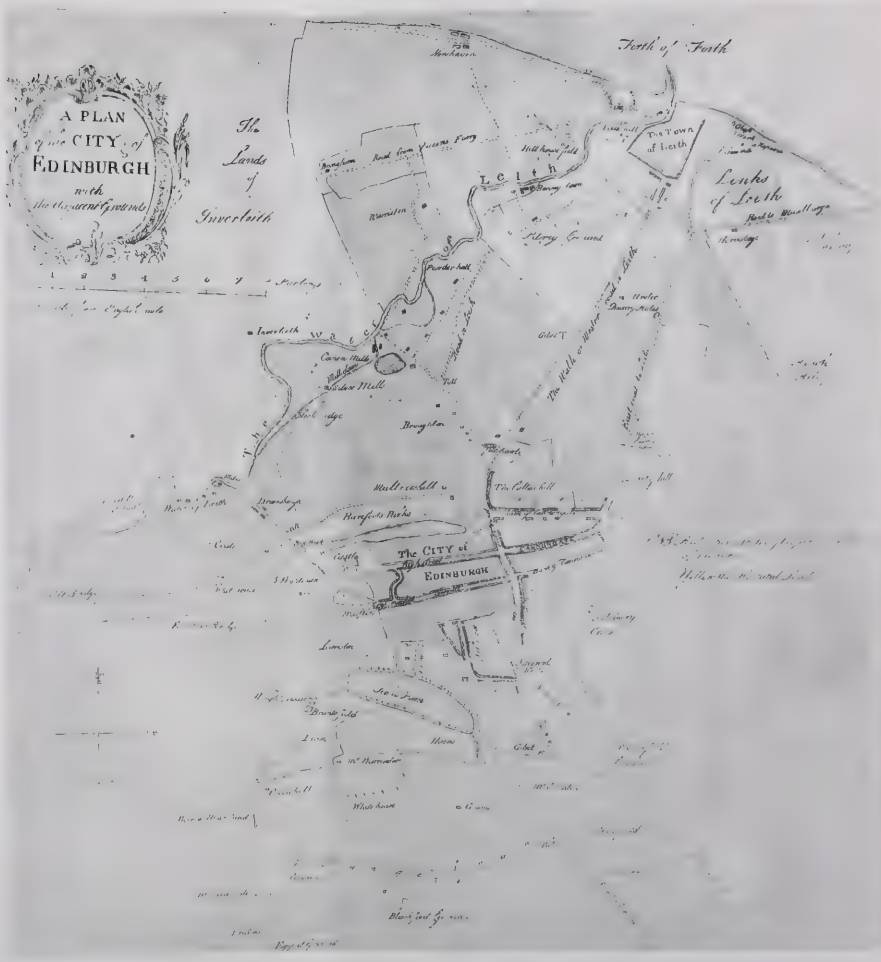

EDENBURGH
George Lockhart

This interesting undated Manuscript Map in the possession of the Edinburgh Corporation is so faded and yellow with age that the distinguishing colours are now almost invisible.

The City of Edinburgh property is shown pink, and the lands outside the wall can be distinguished by a pink boundary colour. Beginning at the west they include "Barefoots Parks" from the Toll to Low Maltresshill, then round the Calton Hill to the Canongate and Back Canongate, and round by the City Wall to the West Port and on to the "Loch"; with outlying parts at Water of Leith Village, Hope Park, Bruntsfield Links and at "Gibet."

The (Heriot's Hospital lands, beginning at the West at Coltbridge, follow the Water of Leith to Canonmills (with a part across the Water at Dockbridge), included Warriston, and the boundary continued to the "Gibet," at Leith Walk, followed that road, and then circled irregularly round by Hawkhill to Abbeyhill, and then along the City property to Maltresshill to "Whitehouse" and Coltbridge.

Leith property is coloured pink also. As the City acquired Barefoots Parks in 1716; obtained Nearly in 1730; St. Leonard's and Heriotscroft 1737, and Maltresshill in 1763, this map would appear to have been drawn about 1730.



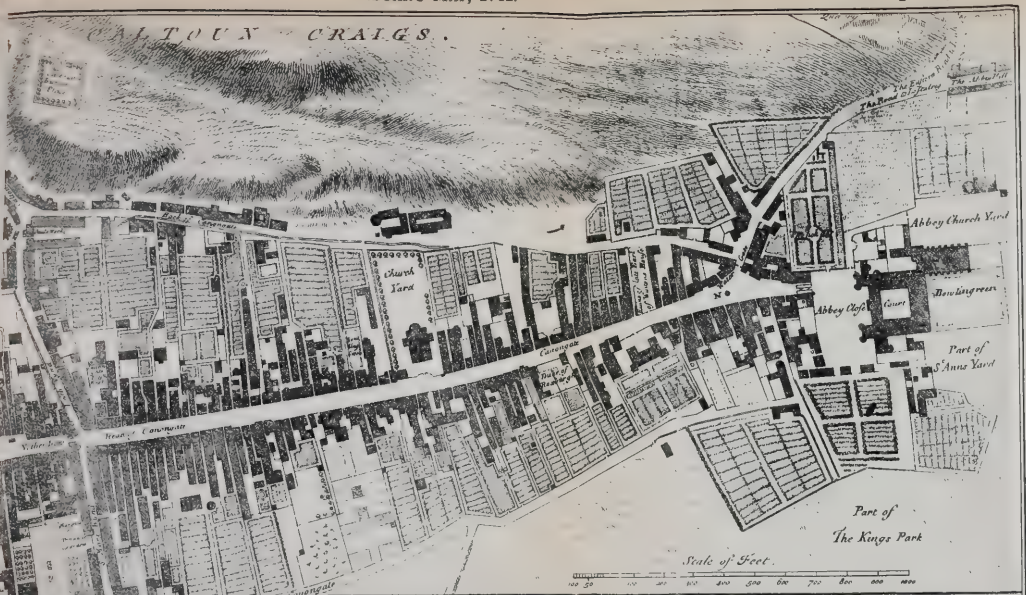
Explanati
A. Reservoir or Water House
B. Milns court
C. Jamess Court
D. Back of Wardrobes Court
E. Back of Paterson's Court
F. Back of Writers Court
G. New Exchange
H. Under Flesh Mercat
I. Upper Flesh M.
K. New Port.
L. Stairs at the Sea
M. Mint Spot of Ground
N. New Flesh Mercat
O. Pultery Mercat
P. Royal Bank
Q. Old Flesh Mercat
From A to L goes down the North Sea
From M to T goes up the South side
From U to Z goes down the High St.
BARLEFOC
Castle Barras
Road from
Wrights Houses
Brunsfield Links
Brunsfield Links
Greenhill Parks

Explanation.
A. Parliament House
B. Advocates Library
C. Jamesons Court
D. Bank of Hardcastles Court
E. Bank of Fairholms Court
F. Bank of Herries's Court.
G. New Exchange.
H. Trades Hall.
I. Upper High Street.
K. New Street.
L. Steps at the foot of Chalmers Close.
M. Mint Court & Liberty Close.
N. New Church Street.
O. Infirmary Street.
P. Blair's Court.
Q. Old High Street.
R. Parliament Close.
S. Lists over the Parliament Houses and Statues of Kings & Queens.
T. New Old Bridge. U. Bridge Head. V. Richard Watt.
W. Forrestors Wynd Wall.
X. Land Wall.
Y. Niddrys Wynd Wall.
Z. Mountain Wall.
&c. Water Square & Stairs from the High Street to the Bridge.
A Scots Mile Leagued on the North Side of the City
From M to P goes up the South side of the City
From Q to Z goes down the High Street
Long Dykes
BAREFOOTS PARKS
North Loch
Calton Hill & Craigs
Calton Burying Ground
Nelsons Tomb
Regent Bridge
Waterloo Place
Princes Street
Calton Mill park
Castle Hill
Castle Street
Lothian Street
Infirmary Street
Chalmers Close
Chalmers Hospital
Chalmers Close
Archers Seat
Wrights Houses
Brunsfield Links
THE MEADOW OR HOPE PARK
Gibbet Loan
Greenhill Parks

The PLAN
of the City and Castle
of EDINBURGH by
Wm Edgar Architect
anno 1742
NISI DOMINUS FRUSTRA
The NORTH LOCH
A Bow of Water at the West of the Loch
The CASTLE
Castle Hill Walk
Land Market
Parliament Close
Fish Market
Old Way to St Cuthberts
Gray Friars
Church Yard
Bowling Green
Argyle Square
College
Reading Room
Avenue to Watsons Hospital

College
Bowling Green
Butter Barn
Market
New Port

'LAN
and Castle
BURGH by
1765



The Author of this Plan having inserted the Names of the Principal Streets and Buildings, and referred to the Names of the most noted Wynds, Courts and Closes within the City Wall by proper numbers in the Plan and Table following, amounting to 97. besides which he shews in that there are 121 others within the Town Wall which together with 76 in the Canongate make the number 294 exclusive of those in the other Suburbs — which joined to the former make the number of all the Streets Squares Wynds Courts Closes &c within the City and Suburbs of Edinburgh amount to the additional Names of which shall be set forth in the Body of the History for the information of the Reader.

The Names of the Principal Wynds Courts Closes &c within the City referred to in the Plan and the Places following the Table not inserted therein are referred to by Letters in the Plan as followeth

1 Lady Jeans Close	26 Kitchiesons Close	51 Gunnis Close	76 Peebles Wynd	To distinguish the Places whose Names are inserted in the Plan that cannot for want of Room, in this Reduced Plan from those in the above Table, they are here referred to by Letters following
2 Upper Bristo's Close	27 Dowlin's Close	52 Curry's Close	77 Martins Wynd	
3 Wardrops Court	28 Newbank Close	53 Riddels Close	78 Nidries Wynd	
4 Ritchsons Court	29 Lyons Close	54 Fishers Close	79 Kinlochs Close	
5 Middle Bristo's Court	30 Jacksons Close	55 Lord Elchos Close	80 Dicksons Close	
6 Lower Bristo's Court	31 Flesh market Close	56 Walter Wilkes Close	81 Cants Close	
7 Horse Close	32 Middle Flesh market Close	57 Old Bank Close	82 Lord Stracathro's Close	
8 Gallowgs Close	33 Bulls Close	58 Gibsons Close	83 Black Friers Wynd	
9 Crombies Close	34 Mills Square	59 Libertons Wynd	84 Todricks Wynd	
10 Adams Close	35 Hills Close	60 Clelland's Close	85 Bowhills Close	
11 Bowers Close	36 Lyon and Turbits Close	61 Forresters Wynd	86 Skinners Close	
12 Dipered Close	37 Rutherfords Wynd	62 Black Friers Wynd	87 Grays on that Close	
13 Advocats Close	38 Pitcairs Close	63 Bells Wynd	88 Hyndfords Close	
14 Roxburghs Close	39 Carmichaels Close	64 Steils Close	89 Fowlers Close	
15 Penns Close	40 Gibbs Close	65 Fishmarket Close	90 Fountain Close	
16 Warristons Close	41 Mossmans Close	66 Back of Butchers Close	91 Marquis of Tweeddales Close	
17 Writers Court	42 Bailly Nifes Close	67 Borthwicks Close	92 Norths end Close	
18 Mary Kings Close	43 Smiths Close	68 Assembly Close	93 Craigs Close	
19 Stewarts Close	44 Bannatyns Close	69 Lees Close	94 Scots Close	
20 Fairweens Close	45 Chalmers Close	70 Covenant Close	95 Hasties Close	
21 Mosse Close	46 Sandilands Close	71 Burnets Close	96 Robertsons Close	
22 Oates Close	47 Hendersons Close	72 Bells Wynd	97 High School Wynd	
23 Old Bothwick Close	48 Forrets Close	73 New Assembly Close		
24 Anchor Close	49 Primrosses Close	74 Stansfields Close		
25 Swans Close	50 M^r Sinclairs Close	75 Kennedys Close		

A Chandler
B Magdalen Chappel
C Lord Minto's
D Lady Yesters Church
E The Market Cross
F The Town Guard House
G The Girth Cross

P. Fourdrinier Exc.

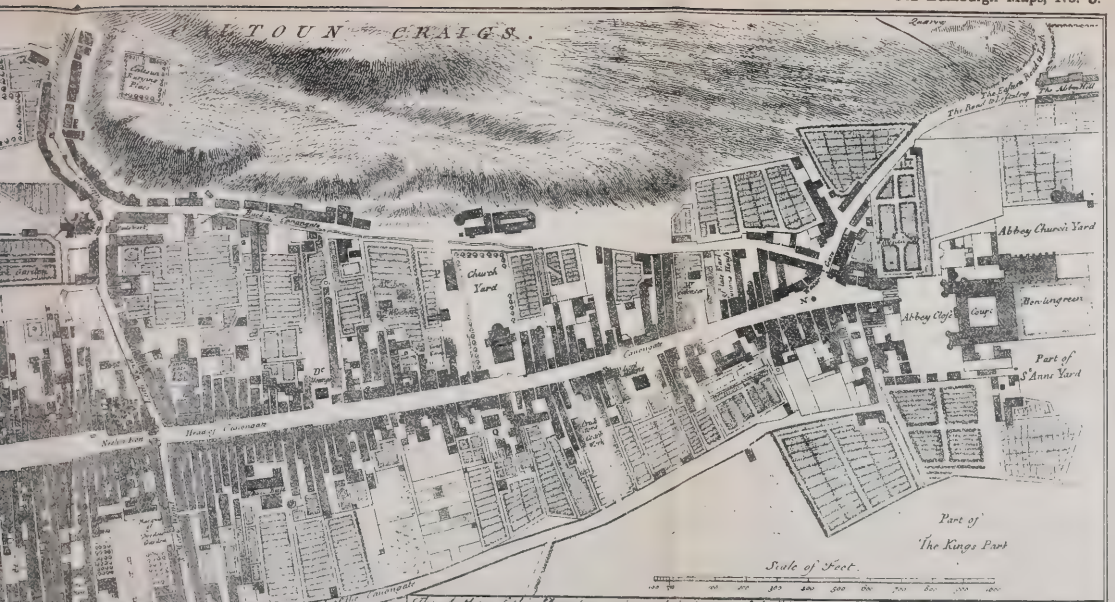
The PLAN
of the City and Castle
of EDINBURGH by
Will.m Edgar Architect
anno 1765
NISI DOMINUS FRUSTRA
N.B. All the New Buildings &c are Expressed in this Plan
to the Present Year by an Eminent Engineer.
The North Loch
now drained
A Bog or Morass at the Head of the Loch
Castle Hill Walks
Grass Market
Gray Friars
March Yard
Bowling Green
Lady Nidderie's Land
Avenue to Watson's Hospital

NISI DOMINUS FRUSTRA
The North Loch
now drained
Long Gate
Walters Hill
Physick Garden
Flesh Market
Corn Market
James's Market
Parliament Close
Bowling Green
Gray Friars
Church Yard
College
Lady Nicholson's Park
Bowling Green
Avenue to Watson's Hospital

The Author of this Plan having inserted the Names of the most noted Wynds Courts &c. Table following, amounting to 97. besides which together with 76 in the Canongate which joined to the former make the whole and Suburbs of Edinburgh amount to the History for the information of the

The Names of the Principal Wynds Courts &c. following the Table not inserted therein are

1 Lady Stairs Close	26 Hutchesons Close
2 Upper Bakers Close	27 Bremners Close
3 Windrops Court	28 Newbank Close
4 Johnsons Court	29 Lyons Close
5 Middle Bakers Court	30 Jacksons Close
6 Lower Bakers Court	31 Fleshmarket Close
7 Morocco Close	32 Middle Fleshmarket Close
8 Galloways Close	33 Bells Close
9 Dunbars Close	34 Mills Squaire
10 Allens Close	35 Riding School
11 Browns Close	36 Stables
12 Byres's Close	37 Halkertons Wynd
13 Advocates Close	38 Kinlochs Close
14 Roxburghs Close	39 Carrubbers Close
15 Penns Close	40 Grays Close
16 Warristons Close	41 Morrisons Close
17 Writers Court	42 Baillie Fyfes Close
18 The Royal Bank	43 Smiths Close
19 St Cecilias Hall	44 Barringers Close
20 Monros New Close	45 Chalmers Close
21 Shaws Close	46 Sandilands Close
22 Craigs Close	47 Hewtriths Close
23 Old Bellhouse Close	48 Trunks Close
24 Anchor Close	49 Ramsays Close
25 Swans Close	50 D. Sinclairs Close

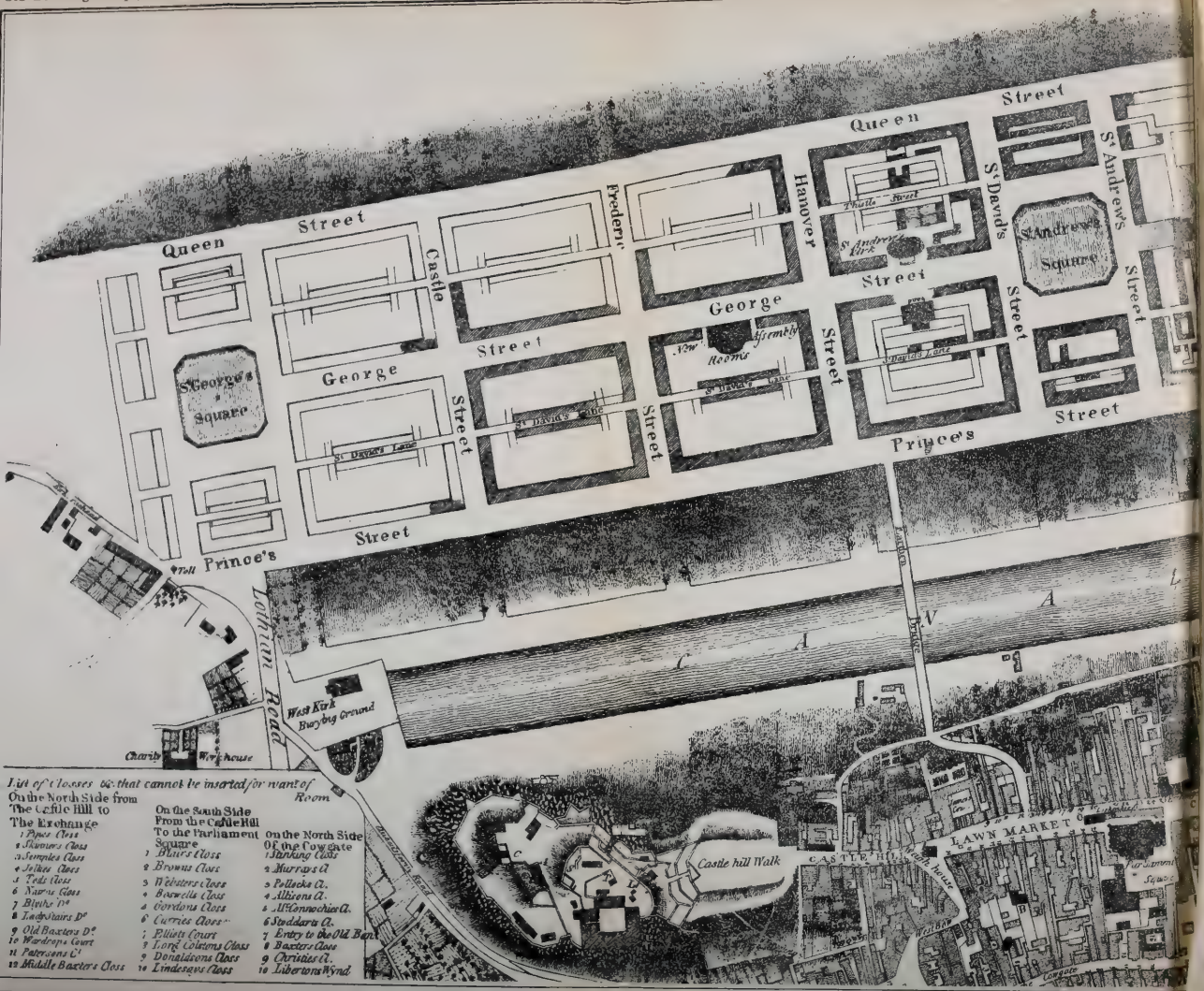


The Author of this Plan having inserted the Names of the Principal Streets and Buildings, and referred to the Names of the most noted Wynds, Courts and Closes within the City Wall by proper Numbers in the Plan and Table following, amounting to 97 - besides which he shows us that there are 121 others within the Town Wall which together with 76 in the Canongate make the number 294 exclusive of those in the other Suburbs - which joined to the former, make the number of all the Streets, Square, Wynds, Courts, Closes, &c within the City and Suburbs of Edinburgh amount to 320 the additional Names of which shall be set forth in the Body of the History for the information of the Reader.

The Names of the Principal Wynds Courts Closes &c within the City referred to in the Plan and the Places following the same not inserted thereon are referred to by Letters in the Plan as follows viz.

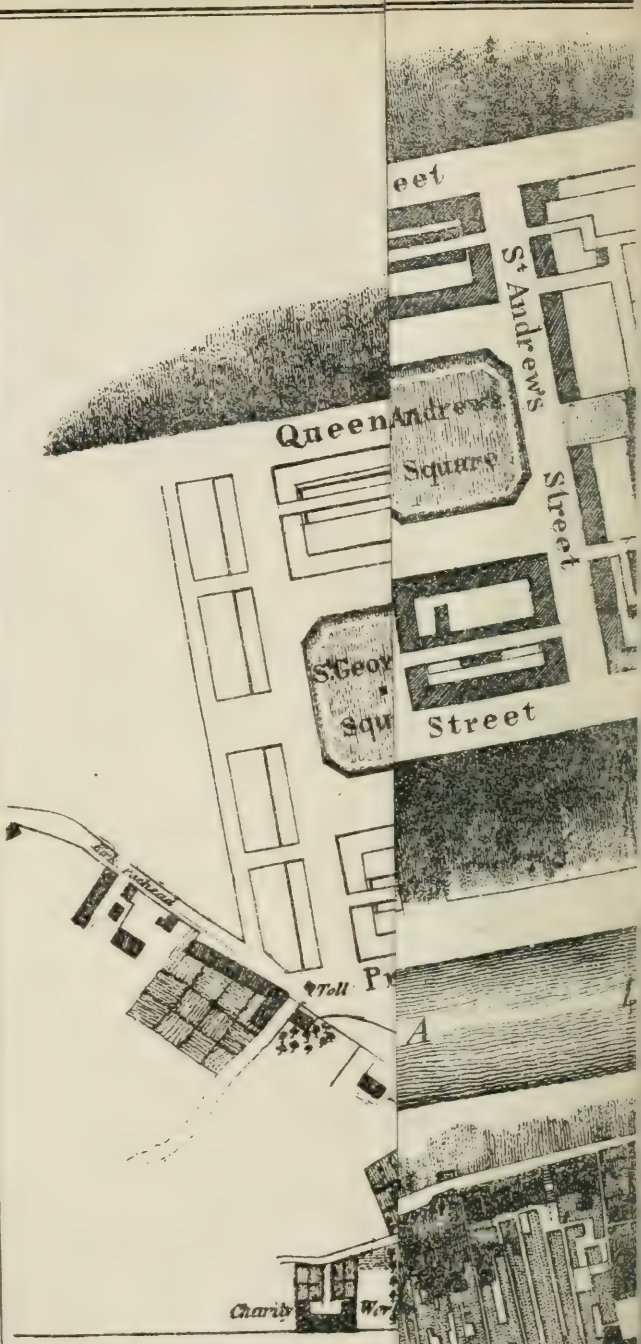
1 Lady Stairs Close	21 Hutchesons Close	41 Grants Close	61 Rebbles Wynd	To distinguish the	
2 Mayor Bruces Close	22 Fombers Close	42 Carrys Close	62 Martins Wynd	Places whose Names	
3 Windrops Court	23 Newbank Close	43 Riddels Close	63 Nidries Wynd	are inserted in the original	
4 Hebrons Court	24 Lyons Close	44 Sythers Close	64 Henderds Close	Plan that cause for	
5 Middle Bows Court	25 Forbesses Close	45 Lord Elchos Close	65 Dickson Close	want of Room, in the	
6 Lower Bows Court	26 Flashmarket Close	46 Walter Wilsons Close	66 Annis Close	reduced Plan	
7 Morocco Close	27 Middle Exchange Close	47 Old Bank Close	67 Lord Binghams Close	from those on the above	
8 Dallonays Close	28 Bells Close	48 Gyffords Close	68 Black friers Wynd	Table they are	
9 Dunbars Close	29 Mills Square	49 Libertons Wynd	69 Todrichs Wynd	referred to by Letters	
10 Ellers Close	30 Riding School	50 Carthuses Close	70 Murdochs Close	as follows viz.	
11 Browns Close	31 Stables	51 Forresters Wynd	71 Skinners Close	A Reservoir	
12 Byres's Close	32 Hutherfords Wynd	52 Bachs or Bells Wynd	72 Craigs or Alans Close	B Tolbooth	
13 Advocates Close	33 Kinlochs Close	53 Bells Wynd	73 Hyndfords Close	C Maddox hold Church	
14 Roxburghs Close	34 Carrubbers Close	54 Steels Close	74 Fowlers Close	D Tolbooth Church	
15 Donal Close	35 Gentys Close	55 Fishmarket Close	75 Fountain Close	E Fishmarket	
16 Warristons Close	36 Monteiths Close	56 Black friers Burchmarks Close	76 Mungos or Kentigerns Close	F Marys Chappel	
17 Writers Court	37 Bells or Price Close	57 Bordwicks Close	77 Mortlands end Close	G Chanter	
18 The Royal Bank	38 Smiths Close	58 Abernethy Close	78 Craigs Close	H Magdalen Chappel	
19 St Cecilias Hall	39 Barringers Close	59 Lions Close	79 Todds Close	I Lord Hunters	
20 Monteiths New Close	40 Chalmers Close	60 Covenant Close	80 Hamilts Close	K Lady Yesters Church	
21 Mans Close	41 Swindlands Close	61 Bisnots Close	81 Robertsons Close	L The Merchant Croft	
22 Craigs Close	42 Menteiths Close	62 Bells Wynd	82 High School Wynd	M The Town Guard House	
23 Old Post House Close	43 Hanks Close	63 New Assembly Close	S Taylor Work House	N The Garth Croft	
24 Archer Close	44 Romans's Close	64 Shoe Lanes Close	R The Lord Lieut Stone of Road along the Watercourse Bridge	O Allisons Yard	
25 Swans Close	303 Sinclair's Close	65 Kennedys Close		P Canongate Church with Horse	

Q Rem of the Bridge Preserved



List of Closses &c. that cannot be inserted for want of Room

On the North Side from The Castle Hill to The Exchange	On the South Side From the Castle Hill To the Parliament Square	On the North Side Of the Cowgate
1 Pipers Close	1 Blairs Closs	1 Sinking Close
2 Skinners Close	2 Browns Close	2 Murrays Cl
3 Semples Close		
4 Jollies Close		
5 Tods Close	3 Websters Close	3 Pollocks C.
6 Norries Close	4 Boswells Close	4 Allisons C.
7 Blyths Dº	5 Gordons Close	5 M.Connochies C.
8 Backstairs Dº	6 Curries Close	6 Stoddarts C.
9 Old Baxters Dº	7 Elliots Court	7 Entry to the Old Bent
10 Wardrops Court	8 Long Colstons Closs	8 Baxters Close
11 Patersons Cº	9 Donaldsons Close	9 Orbiston C.
12 Middle Baxters Closs	10 Lindesays Close	10 Liberton's Wynd



List of Closses &c. that cannot be ins

On the North Side from The Castle Hill to The Exchange

1 Pipes Closs
2 Skinners Closs
3 Semples Closs
4 Jollies Closs
5 Teds Closs
6 Nairns Closs
7 Blyths Dº
8 LadyStairs Dº
9 Old Baxters Dº
10 Wardrops Court
11 Patersons Cᵗ
12 Middle Baxters Closs

On the South From the Ca To the Parli Square

1 Blairs Closs
2 Browns Closs
3 Websters Clos
4 Boswells Clos
5 Gordons Clos
6 Curries Closs
7 Elliots Court
8 Lord Colston
9 Donaldsons
10 Lindesays

St James's Square
Register Office
Theatre
Orphan Hosp
Old Physic
Flesh Market
HIGH ST
Easter Road to Leith
Chapel
Holyrood
House
Abbey Close

Leith Walk
St James's Square
Catherine Street
Regulator Office
Methodist Meeting
Calton Burying Ground
Observatory
CALTON HILL
Theatre
Orphan Hospital
College Church
Old Physic Garden
North Back of the Canongate
Charity Workhouse
Canongate Church
Post of the Canongate
Abbey Close
Chapel
Hollyrood House
Leith Road to Leith
Mark Market
HIGH STREET
Tolbooth
Tolbooth Wynd
Canongate Head
CANONGATE
Chalmers Street
South Back of the Canongate
School

15 Gallowgate Closs
16 Dunbar's Closs
17 Cebor's Closs
18 Browns Closs
19 Byres's Closs
20 Advocates Closs
21 Roxburghs Closs
22 Dons Closs
23 Warristons Closs
24 Writers Court

North Side of the High Street from The Exchange to The Netherbow

1 Mans Closs
2 Craigs Closs
3 Old Posthouse Cl.
4 Anchor Closs
5 Swans Closs
6 Geddes's Closs
7 Knells Closs
8 Ship Closs
9 Lyon's Closs
10 Jacksons Closs
11 Flesh Market Cl.
12 East D° D°
13 Bulls Closs
14 Mulns Square
15 Halkerstons Wynd
16 Kinlochs Closs
17 Carrubbers Closs
18 Bishops Closs
19 Grays Closs
20 Morrisons Closs
21 Baillie Fyfes Closs
22 East D° D°
23 Barrengers Closs
24 Chalmers's Closs
25 Sandilands Closs
26 Montachs Closs
27 Trunk Closs
28 Hynes Closs
29 Moffats Closs
30 Baron Maids Closs
31 Baron Grants Closs
32 Baillie Grants Closs

North Side of the Grass Market

1 Back of the boughts
2 Stevensons Closs
3 Douglass Closs
4 Stenters Closs
5 Camerons Entry
6 Castle Wind
7 Carmichels Closs
8 Crookes Closs
9 Mowes Closs
10 Plaistrone Closs
11 Carries Closs
12 Begbies Closs

13 Potters Closs
14 Johnstons Closs
15 Riddles Closs
16 Tishers Closs
17 Brodies Closs
18 Buchanans Closs
19 Old Bank Closs
20 Grafords Closs
21 Libertons Wynd
22 Turks Closs
23 Forresters Wynd
24 Back of Bess Wynd
25 Bess Wynd

South Side of the High Street from the Parliament Square to The Netherbow

1 New Bank Closs
2 Old fish Market Cl.
3 Borthwick Closs
4 Old Assembly Cl.
5 Covenant Closs
6 Hornets Closs
7 Bells Wynd
8 New Assembly Cl.
9 Stonelaws Closs
10 Kennedys Closs
11 Peebles Wind
12 Mertins Wynd
13 Nuddrys Wynd
14 Kinlochs Closs
15 Dicksons Closs
16 Cants Closs
17 Strichens Closs
18 Black Friers Wind
19 Todricks Wind
20 Murdochs Closs
21 Skinners Closs
22 Grays Closs
23 Hyndford Closs
24 Foulis's Closs
25 Fountain Closs
26 Tweedales Closs
27 Worldsend Closs
28 Stewarts Closs

South Side of The Grass Market

1 Oleghorns Closs
2 Ewe and Lamb Cl.
3 Esplins Closs
4 Bruces Closs
5 Low Hamiltons Cl.
6 Upper D°
7 Mans Closs
8 Pringles Closs
9 Mc Intires Closs
10 Gibsons Closs
11 Hunters Closs
12 Walker Closs

29 Merlins Wynd
30 Fish — Market
31 Nuddrys Wynd
32 Dicksons Closs
33 Cants Closs
34 Cesfords Cl.
35 Blackfriars Wind
36 Todericks Wynd
37 Grays Closs

South Side of The Cowgate

1 Henrys Closs
2 Sparks Cl.
3 Hammermans Cl.
4 Old Excise Office
5 Dyers Closs
6 Wright Cl.
7 Cowans Cl.
8 Humes Cl.
9 Campbels Cl.
10 Ayres Cl
11 Scotts Cl.
12 Brodies Cl.
13 Taylors Hall
14 Campbels Cl.
15 Kays Closs
16 Kincaids Court
17 Simsons Cl.
18 Horse Wynd
19 Peters Closs
20 Dicks Closs
21 College Wynd
22 Wilsons Closs
23 Sterch Cl.
24 Hastes Cl.
25 Thraples Cl.
26 Wrights Cl.
27 Adams Court
28 Aitkens Closs
29 Robertsons Cl.
30 Butts Cl.
31 High School Wind
32 Bulls Closs
33 Silver wells Cl.

North Side of the Canongate

1 Fleshmarket Closs
2 Gouls Closs
3 Westcommon Cl.
4 Mid commond.
5 Eastcommon Cl.
6 Raes Closs
7 Morrocos Cl.
8 Setons Cl.
9 Kinlochs Cl.
10 Arr Bank Cl.
11 Jacks Court.
12 Jacks Closs
13 Shoe makers Cl.
14 Dark D° D°
15 Bowling Green Cl.
16 Aitkens Cl.
17 Tolbooth Wynd
18 Bakehouse Cl.
19 Dunbars Cl.
20 Fanmair Cl.
21 Browne Cl.
22 Monros Cl.
23 Lochends Cl.
24 East D° D°
25 Reids Yard
26 Campbells Cl.
27 Semmerrites Cl.
28 Mallochs Cl.
29 Callenders Cl.
30 Forsyths Cl.
31 Gallowgats Cl.
32 Ramsays Cl.
33 Duncans Cl.
34 White Horse Cl.

South Side of the Canongate

1 Sinking Closs
2 Boyds Cl.
3 Bells Cl.
4 Goollens Cl.
5 Gibbs Cl.
6 Perrys Cl.
7 Cheisels Court
8 Plainstone Closs
9 Watsons Cl.
10 Milns court
11 Weirs Closs
12 Up Playr house Cl.
13 Downmost D° D°
14 St Johns Closs
15 Linnen Hall
16 Finlaysons Cl.
17 Sugar house Cl.
18 Hammermens Cl.
19 Wilsons Court
20 Coopers Closs
21 Goulles Cl.
22 Crichtons Cl.
23 Crichtons Entry
24 Drummonds Cl.
25 M Grigors Cl.
26 Falkners Cl.
27 Scrachies Cl.
28 Reids Closs
29 Fullertons Cl.
30 Boyds Cl.
31 Cummings Cl.
32 Thompsons Cl.
33 Penmans Cl.
34 Charteriss Cl.
35 Brodies Cl.
36 Horse Wynd
37 Perries Cl.

Potter-row and Bristo

1 Mc Vicars Entry
2 Middletons Entry
3 Allisons Square
4 Generals Entry
5 Starks Closs
6 Kellys Closs
7 Hamiltons Entry

References to the Public Buildings &c.

A Water house
B Old Bank
C Tolbooth
D Haddow's hold Church
E Tolbooth D°
F Old D°
G New D° Isle
H New Church
I City Clerks Chamber
K Custom house
L Royal Bank
M Parliament house
N Insurance Office
O S.C.W. Forbes & Co. Bankers
P Poultry Market
Q City Guard
R Tron Church
S Green Market
T S.t Mary's Chapel
U Concert Hall
V Lady Yesters Church
W Medical Society Hall
X Trades Hospital
Y Correction house & Bedlam
Z English Chapel
a D.° D.°
b Stamp Office
c General Post Office
d Barrean Meeting
e English Chaple
f Trinity Hospital
g Excise Office

A SCALE of 1900 FEET
Feet 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 Two Feet

Edin.r Printed for J. Ainslie, Geographer, Maps and Printseller, where may be had all Sorts of Drawing and Writing paper's, Plans of Estates Reduced or Enlarged. N.B. Surveying of Lands in all its different Branches.

RASS MARKE
Merchants Street
Brown Square
Argyle Square
Gray Friars Church
Burying Ground
Heriots Hospital
Work house
Bristow Port
Tirlot Row
Laurieston
La Roste
Watsons Hospital
Wall
George's Square
PARK
OR HOP
Potter-row and
Bristo
e. M.r Vicars Entry
9. Middletons Entry
Allisons Square
Generals Entry
Starks Closs
7. Kellys Closs
8. Hamiltons Entry
References to the Public Buildings &c.
A Water house
B Old Bank
C Tollooth
D Haddow's hold Church
E Tolbooth D.o
F Old D.o
G New D.o Isle
H New Church
I City Clerks Chamber
K Custom house
L Royal Bank
M Parliament house
N Insurance Office
O. S.W. Forbes & Co. Bankers
P Poultry Market
Q City Guard
R Tron Church
S Green Market
T S.t Mary's Chapel
U Concert Hall
V Lady Yesters Church
W Medical Society Hall
X Trades Hospital
Y Correction house & Bedlam
Z English Chapel
a D.o D.o
b Stamp Office
c General Post Office
d Barrean Meeting
e English Chaple
f Trinity Hospital
g Excise Office
orts of Drawing and Writing paper's,

To The Right
Lord
This Plan
Jz

NB. o

To The Right Honourable David Steuart Esq.
Lord Provost of the City of Edinburgh
This Plan is most humbly Dedicated by
His Lordship's most Obed.t Ser.t John Ainslie

N.B. this Plan is Copied from an Old Survey in the Possession of M.r Geo. Paton of the Customs

Ainslie's Map, 1804, N.W.

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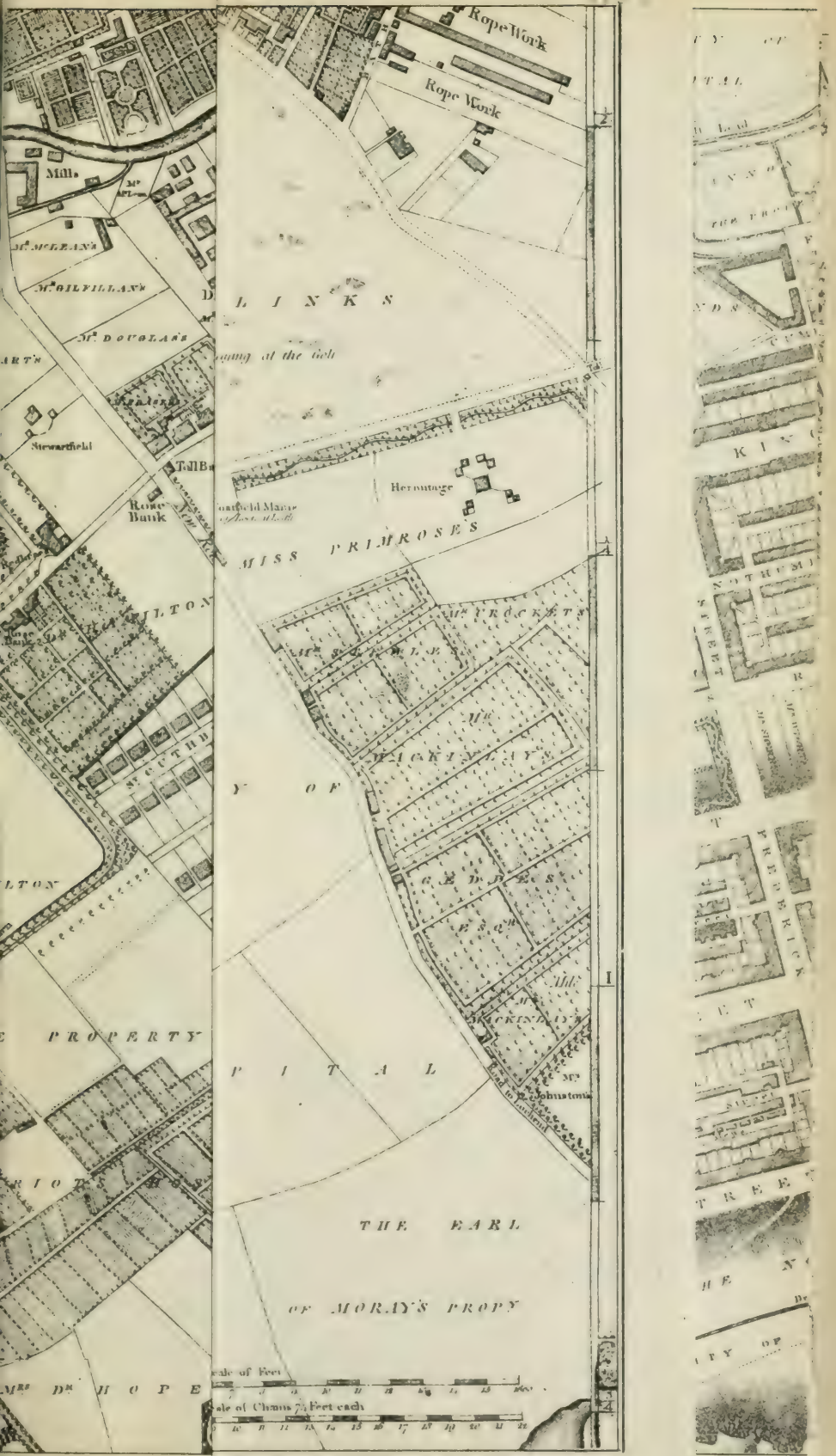
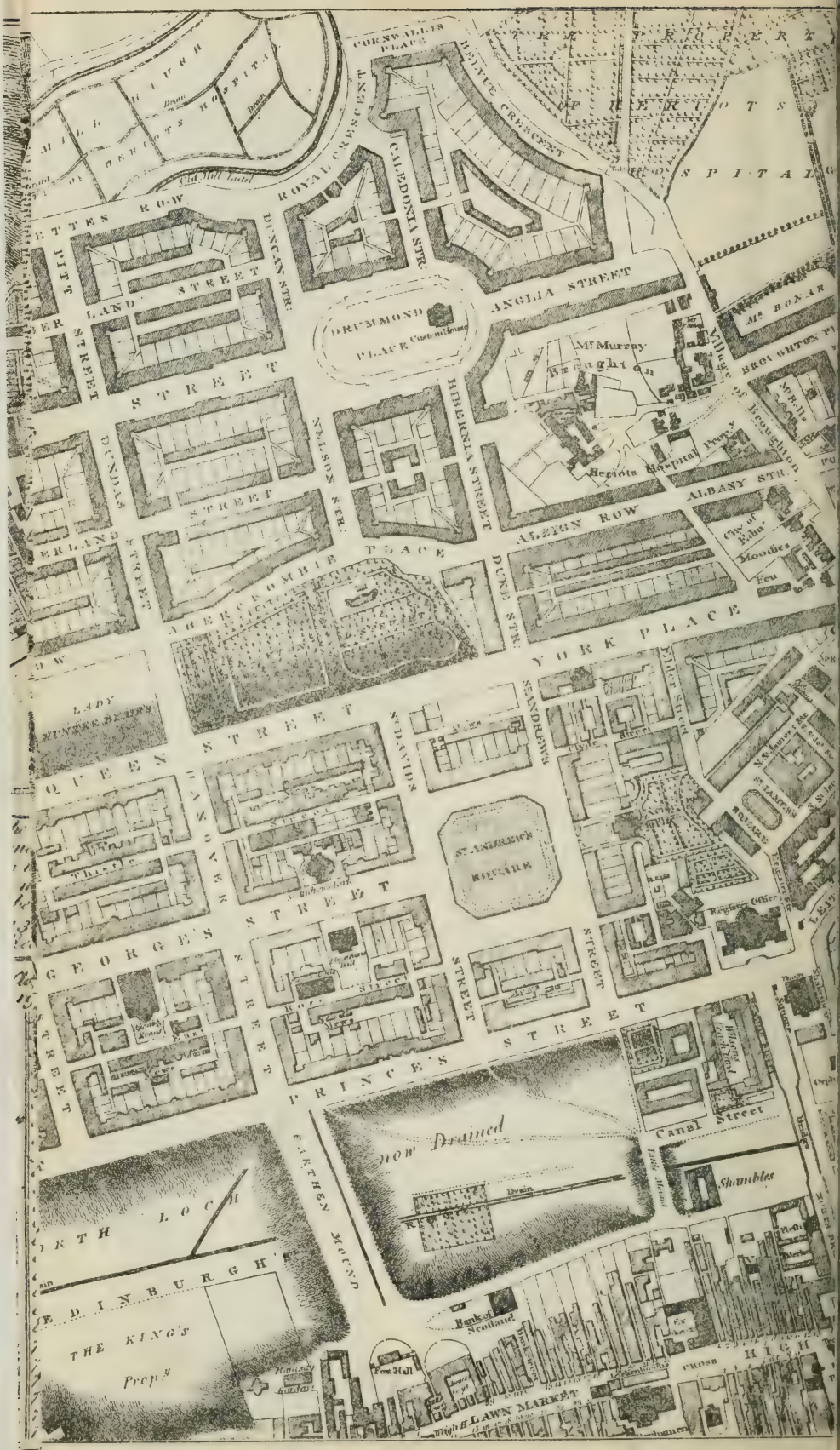

Rope Work
Rope Work
Mills
LINKS
Hermitage
MISS PRIMROSES
Rose Bank
PROPERTY
THE EARL
OF MORAY'S PROPY
Road to Inverleith

ROBERTSON ESQR
Rope Walk
Rope Walk
KIRK YARD
School House
LEITH LINKS
a Common or Pleasing at the 6th
Mr WATSON
Mr BOYD'S
Distillery
Mr DOUGLAS
Mr GILLESPIE'S
Mr BROWN'S
Pilrigg
BALFOUR ESQR
Tollbar
Rose Bank
Broughton Burn
LEITH WALK
Mr Stuarts
Mr Smiths
Foundery
Mr Hunters
Mr Steadmans
Mr Thorburns
Mr Lyons
Mr Hamiltons
Mr Mitchells
Mr Wilsons
Mr Wrights
Mr Millers
Mr Lambs
Mr Hopes
Mr Hamiltons
Mr Hamiltons
Mr Hamiltons

THE PROPERTY OF
HERIOTS HOSPITAL
ROSE ESQr
THE EARL of MORAY'S
KING STREET
QUEEN STREET
GEORGES STREET
PRINCES STREET
YORK PLACE
ALBION ROW
ALBANY STR
ABERCROMBIE PLACE
DUNDAS STREET
CHARLOTTE SQUARE
THE NORTH LOCH
CITY of EDINBURGH
THE KING's
Prep.d
Now Drained
Canal Street
Shambles
HIGH
Proposed New Street
WALKER ESQr
LORD COLLIES
PETTES ROW
ANGLIA STREET
ST ANDREWS
STANDARD
YORK PLACE

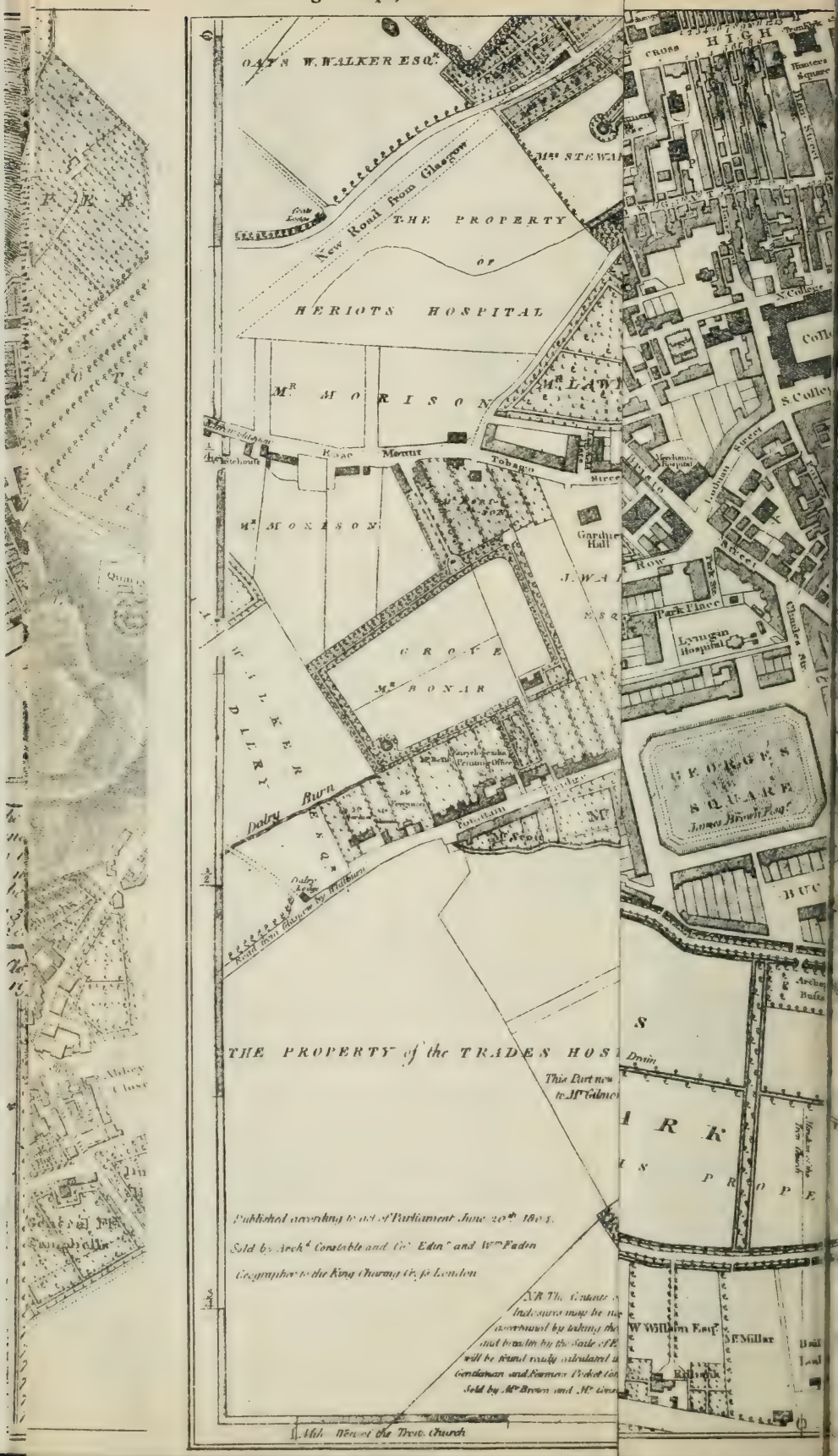
Ainslie's Map, 1804, Centre W.



Physick Garden
THE PARK
Ground
CAMPBELLS

TRINITY HOSPITAL
THE EARL OF
MORAYS PROP
MR FLEMS PROP
Chuck Hall
The Poker Hall

THE KINGS
Prop.y
CASTLE
GRASS MARKET
HIGH
KIRK YARD
GEORGE'S SQUARE
MEADOWS
OR HOPE PARK
THE CITY of EDINB.
RIGG ESQ.R
Drumdrian
Dalry Burn
Dovin
THE PROPERTY of the TRADES HOSPITAL
Gillespie's Hospital
BURYFIELD LINKS
a Delinnon for Playing at the Ball
THE PROPERTY OF HERIOTS HOSPITAL
EARL OF WEMYNS
Mr CRAWFORD'S
Mr KERR
Mr HAIG
Mr GILMOUR
Mr SMITH
Mr MORISON
Mr LAURIE
Mr KIERS
Mr GREEN
Mr LEWIS
Mr BROWN
Mr HENDERSON
Mr MACKENZIE
Mr MACKENZIE of CROMARTY
Mr STEWART
Mr CROFT
Mr WILSON
Mr WARRENDER
Mr SIMPSON
Mr MILLER
Mr WILLSON
Mr SMITH
Mr BUCHAN
Mr LONDON
Mr WARRENDER
Mr MACKENZIE
Mr WALKER
Mr STEWARTS
Mr LAURIE
Mr MORISON
Mr MORISON
Mr WALKER
Mr CROFT
Mr DONALDSON
Mr SMITH
Mr HAIG
Mr GILMOUR
Mr WILSON
Mr WARRENDER
Mr SIMPSON
Mr MILLER
Mr WILLSON
Mr SMITH
Mr BUCHAN
Mr LONDON
Mr WARRENDER
Mr MACKENZIE
Mr WALKER ESQ.R
Mr STEWARTS
Mr LAURIE
Mr MORISON
Mr MORISON
Mr WALKER ESQ.R
Mr CROFT
Mr DONALDSON
Mr SMITH
Mr HAIG
Mr GILMOUR
Mr WILSON ESQ.R
Mr WARRENDER ESQ.R


JAMES W. WALKER ESQR.
New Road from Glasgow
THE PROPERTY
OF
HERIOTS HOSPITAL
MR MORISON
MR MORISON
GROVE
MR BONAR
Dairy Burn
THE PROPERTY of the TRADES HOS
This Part now
to Mr Gilmo
Published according to act of Parliament June 20th 1803.
Sold by Arch.d Constable and Co. Edin.r and Wm Faden
Geographers to the King Charing Cr.s London
HIGH
CROSS
Hunters Square
Lyngan Hospital
GEORGE'S
SQUARE
BUC
PARK
PROPE
W William Esqr
S.r Millar

of EDINBURGH
their proper places for want of room
Potterrow and Bristo
Reference to the Publick Buildings Where there is not room to insert the names in their Proper Places
A Water House Castle Hill
B Bank of Scotland Bank Str
C Tolbooth Lawn Market
D Haddows Hole Kirk
E Tolbooth Kirk
F Old Kirk
G Kirk Isle
H New Kirk
I City Clarks Chamber
K Exchequr
L Parliament House
M Sr William Forbes & Co Bankers
N Mssrs Ramsay & Co Bankers
O Royal Bank
P Poultry & Fish Market
Q Medical Society Hall
R Trades Hospital
S South Tabernacle
T Correction House and Bedlam
V Stamp Office
W Tolmont Post Office
X Burghers Meeting House Bristo Str.
Y Dr Perthrough
Z Antiburgher Meeting House
a Guildfille
b Baptist
c St Marys Chapl
d English
e Merchant Hall
f Publick Dispensary
g British Linen Co Bank
h Hospital for Poor Children
i Cannongate Chapl & Place
k Trinity Hospital
Mr Baggar
Mr Tod
Mr
Charles
1 Mile East of the Tron Church

REFERENCES to the PLAN of EDINBURGH
Names of Closes Courts &c that could not be inserted in their proper places for want of room
On the north side from the Castle Hill to the Exchange
On the south side from the Castle Hill to the Parliament Close
On the north side from the Exchange to the Nether Bow
On the south side from the Parliament Close to the Nether Bow
On the north side of the Grass Market
On the south side of the Grass Market
On the north side of the Cowgate
On the south side of the Cowgate
Potterrow and Bristo
Refrences to the Publick Buildings Where there is not room to insert the names in their Proper Places
THE KING'S PARK
THE EARL OF HADDINGTONS PROP.
PROPERTY
GENERAL FLETCH
Hunter Square
Parliament Close
Exchange
Bridges
Infirmary
Royal Bank
Register Office
Excise Office
Custom House
Post Office
Royal Exchange
Tron Church
Bank of Scotland
Old Assembly
New Assembly
Merchant Company
Surgeons Hall
College
Museum
Theatre
Physicians Hall
Royal Infirmary
Trades Hall
Watson's Hospital
Donaldson's Hospital
Heriot's Hospital
Trinity Hospital
Trinity College Church
Trinity College
Trinity Hospital
Trinity Church
Trinity Chapel
Trinity Hospital
Trinity College Church
Trinity Hospital
Trinity College
Trinity Hospital

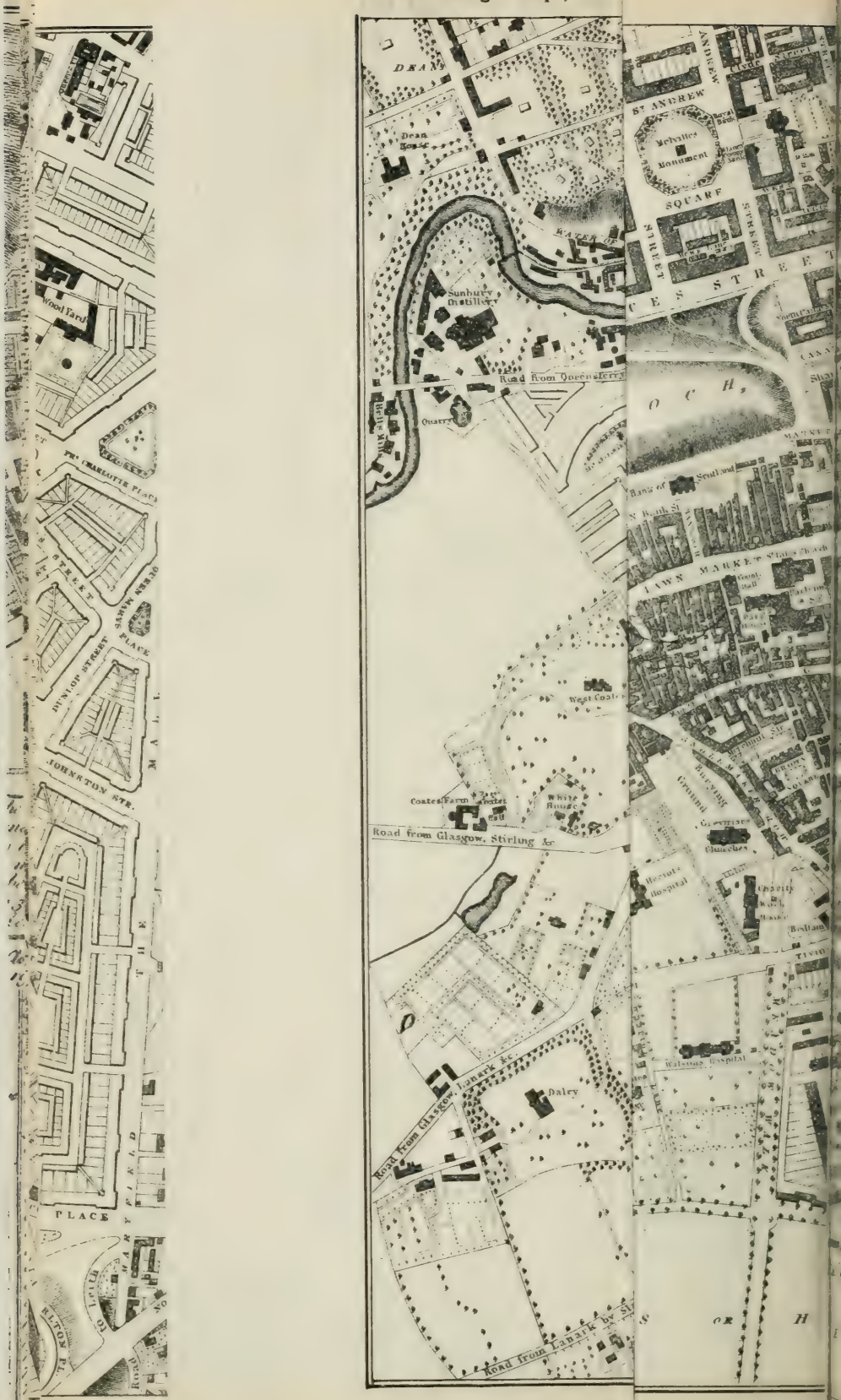
LOTHIAN'S
Plan OF THE City
OF
EDINBURGH
And its
VICINITY.
1825.
Engraved by Geo. Bartholomew.
SCALE
Inverleith Estate
NEW BOTANIC GARDEN
Warriston
Canonmills
Clarks place
WATER
Powder Hall
Clarks Mill
Bleachfield
Deaf & Dumb Institution
Edinburgh Academy
HENDERSON ROW
PARK STREET
CLAREMONT STREET
ROYAL CIRCUS
GLOUCESTER STREET
CUMBERLAND STREET
GEORGE STREET
QUEEN STREET
HANOVER STREET
THISTLE STREET
NORTHUMBERLAND STREET
LONDON STREET
YORK PLACE
DRUMMOND PLACE
JAMES STREET
HOWE STREET
MOW

Lothian Map, 1825, N.W.

Stewartfield
Redbraes
Rosebank
Pilrig House
Broughton Burn
PALMER STREET
CUTHBERT STREET
MELVILLE STREET
MONTROSE STREET
DEANHAUGH PLACE
MACKENZIE STREET
HERIOT ROW
ALEXANDER STREET
THISTLE STREET
HUNTLY STREET
QUEEN STREET
PLAYFAIR STREET
MONTGOMERY STREET
WELLINGTON STREET
HILLSIDE CRESCENT
LEOPOLD PLACE
BRUNSTON
ROYAL TERRACE
PICARDY PL.
EDINBURGH

LEITH LINKS
High School
Gallow House
Toll
Hermitage
Stewartfield
Roseburn
Roseburn House
Roseburn Cottage
Roseburn Toll
Roseburn Bridge
Roseburn Place
Roseburn Terrace
Roseburn Street
Roseburn Path
Roseburn Mill
Roseburn Mill Lane
Roseburn Cottage

Lothian Map, 1825, S.W.

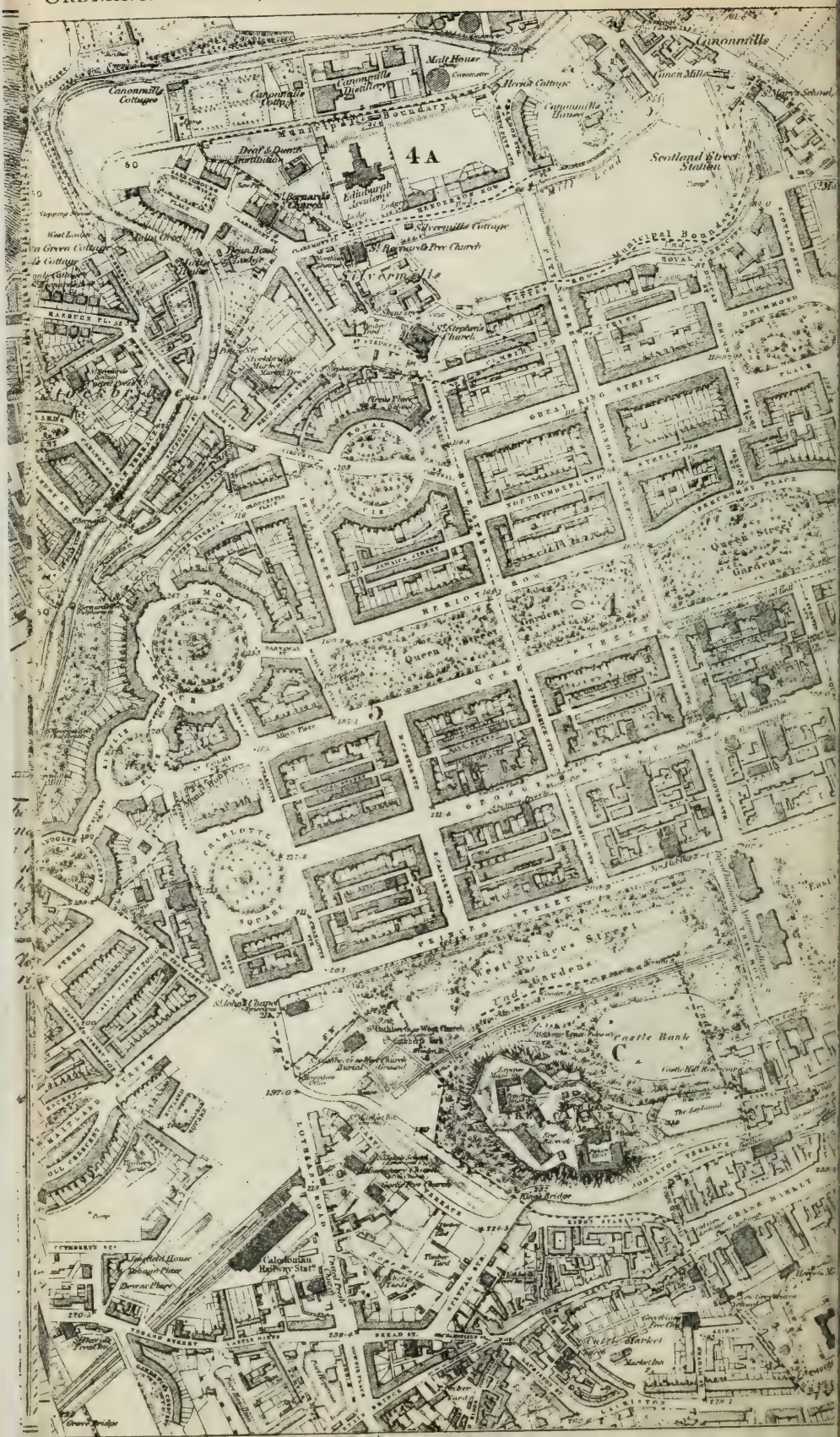

Wool Yard
Dean House
Sunbury Distillery
Road From Queensferry
Quarry
Bank of Scotland
WEST MARKET
Coates Farm
White House
Road from Glasgow, Stirling &c
Daley
Road from Glasgow, Lanark &c
Road from Lanark by
ST ANDREW SQUARE
Melville Monument
PRINCES STREET
QUEEN STREET
GEORGE STREET
PRINCE CHARLOTTE PLACE
QUEEN ANNE PLACE
JOHNSTON STR.
MALT
PLACE

Environs
OF
EDINBURGH
Scale of Miles
Meadow Bank
Muschat's Cairn
Duddingston
Craigmillar
Newington
Dalkeith
Lasswade
Newbattle
Dalhousie
Cockpen
Kirkhill
BRECLEUCH PLACE
E PARK

Environs
OF
EDINBURGH
FIRTH
OF
FORTH
LINLITHGOW
SHIRE
Chuck Mill
House
Burying
Ground
PARK

EDINBURGH
Comely Bank Nursery
Comely Bank Park
Comely Bank
Blacket's Entry
Dean Nursery
Dean Park
Dean Cemetery
Dean Bridge
Stewart's Hospital
Water of Leith
Bells Mills
Bell's Brae
The Haugh
Donaldson's Hospital
Haymarket Mill
Roseburn Brewery
Caledonian Railway
Scotland Street Station
Princes Street
Queen Street
George Street
Castle Rock
Castle Hill
Castle Market
Waverley Bridge
Princes Street Gardens
4A
5
5B
5C
C

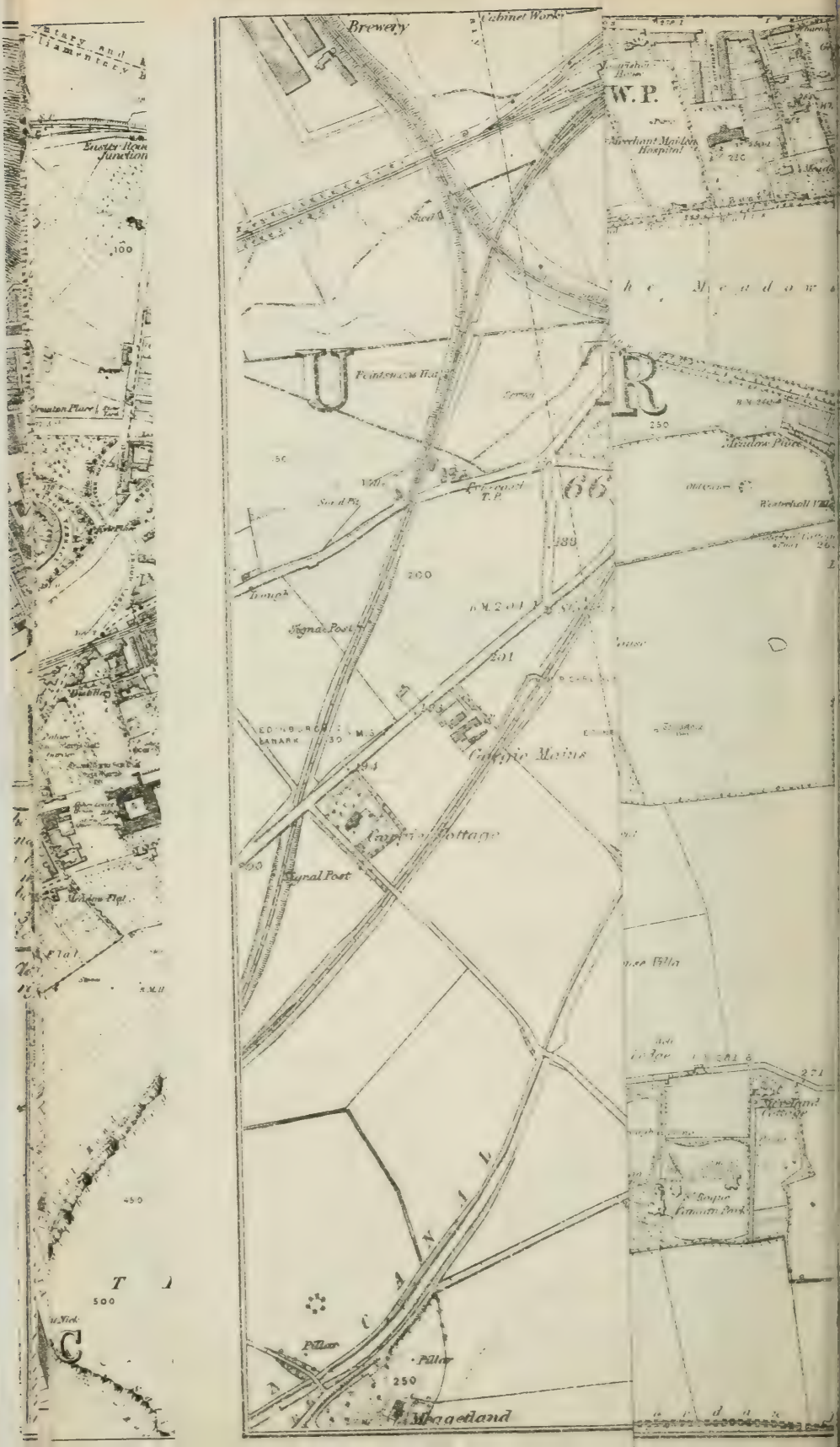
Ordnance Survey, 1852, N.W.



Leith Walk Station
CALTON HILL
Royal Terrace
Regent Gardens
Meadow Gardens
B.C.
3C
3D
STC
ST
1
2
3

2265
Back Drum
Lochend Loch
Lochend House
Lochend
Marionville
Maryfield
3 E
London Road Foundry
North British Railway Works and Locomotive Depot
Abbeyhill Junction
Calton Hill
Regent Gardens
Abbeyhill
Meadow Flat Gardens
Holyrood Palace
Holyrood Abbey
Holyrood Park
Crow Hill
SANCTUARY OF HOLYROODHOUSE
THE QUEENS PARK
CANONGATE
B.C.
680
18

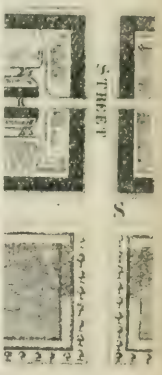
ORDNANCE SURVEY, 1852, S.W.


Brewery
W.P.
Merchant Maiden Hospital
Meadow Place
Gilmore Place
Signal Post
Gilmore Mains
Cottage
Signal Post
Pillar
Pillar
Meggetland
Wauchope Granton Park

16
AT
600
400
700
450
700
600
560
Preston field
Clearburn
EDINBURGH
SOUTHERN CEMETERY
300
The Grange
Cameron
House
Cameron Bank
152
200
Bridge
Threipmuir

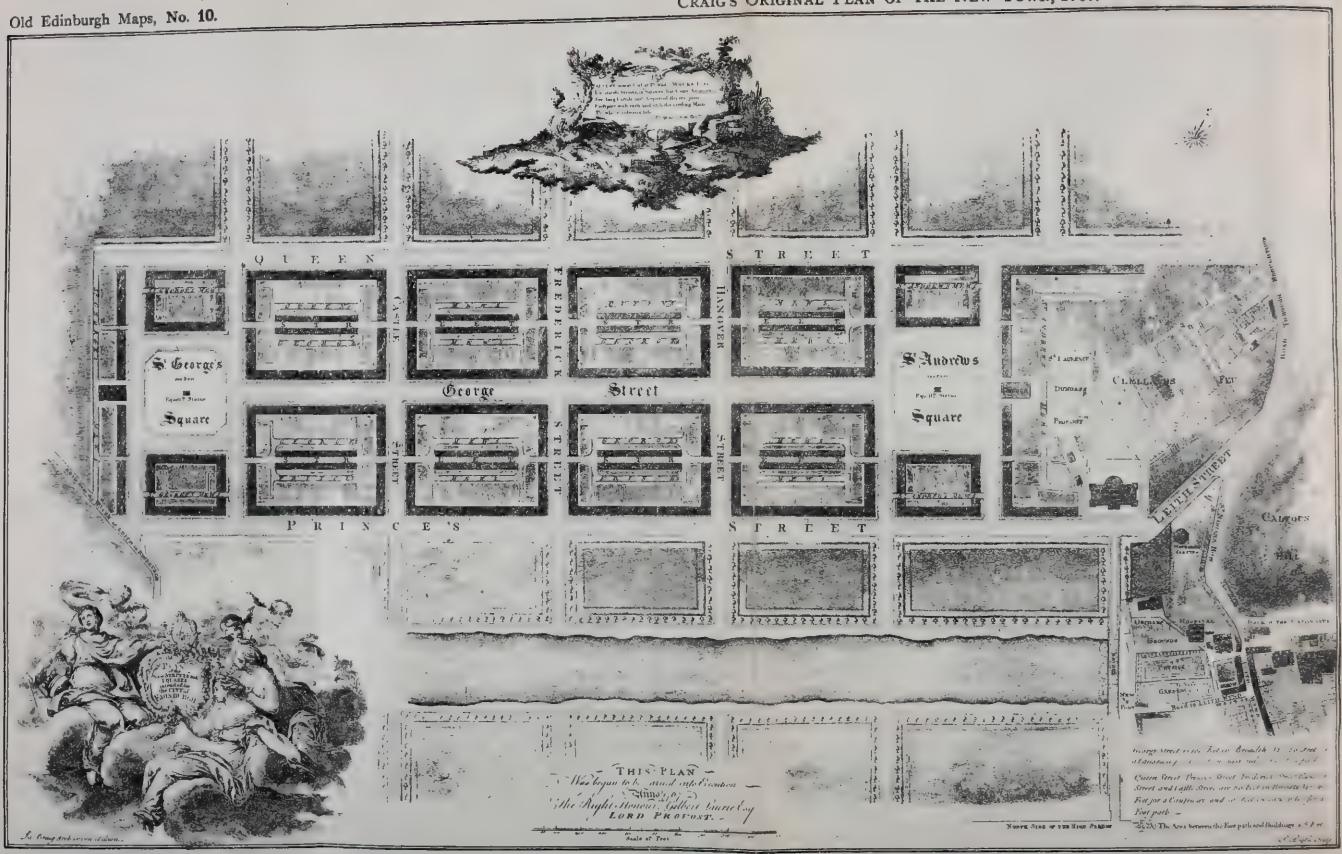
CRAIG'S

HANOVER
STREET



The Meadows
Hope Park
Newington
EDINBURGH SOUTH HILL CEMETERY
The Grange House
West Grange
Dumpmire Reservoir
Old Quarry
Blackford
Blackford House
Arthur's Seat
Nether Hill or the Lions Haunch
Prestonfield
Craigmillar Castle
Craigmillar Castle Road
Duddingston Loch
Echobank
Cleardurn
NEWINGTON CEMETERY
Cameron House
Cameron Bank
Cameron Bridge
Sharmanbie
Park Neuk
Bridge
Weighing Machine
Pumping Station
Reservoir
Quarry
Sewage Ball
Seat
Common Moor

CRAIG'S ORIGINAL PLAN OF THE NEW TOWN, 1767.

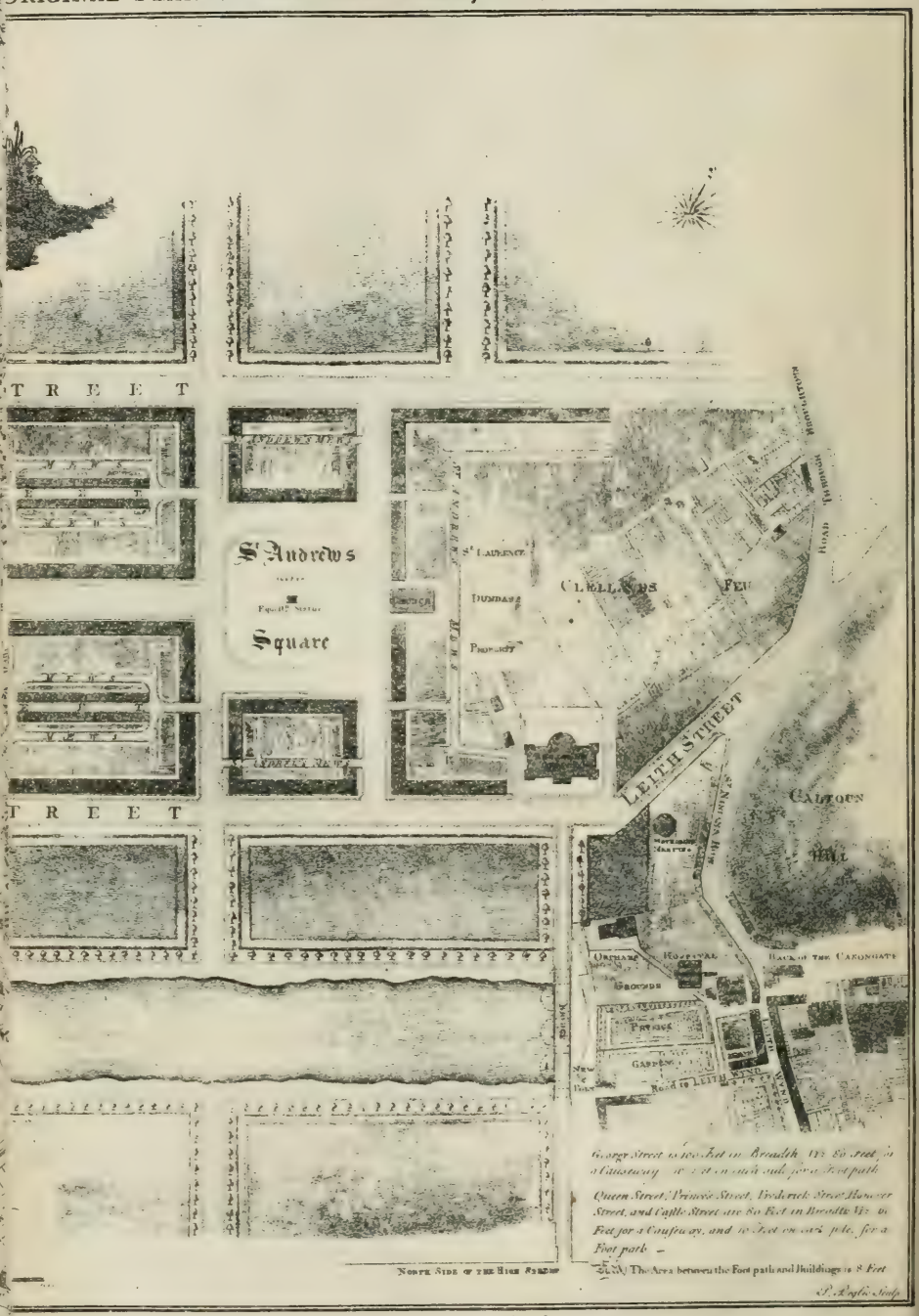


To His Sacred Majesty GEORGE III. The Munificent Patron of Every POLITE and LIBERAL ART.

This PLAN of the New Streets and Squares intended for His annual CAPITAL of NORTH BRITAIN, One of the happy Consequences of the Union Humbly Inscribed By His Majesty's Most Dutiful and Most Obedient Subject

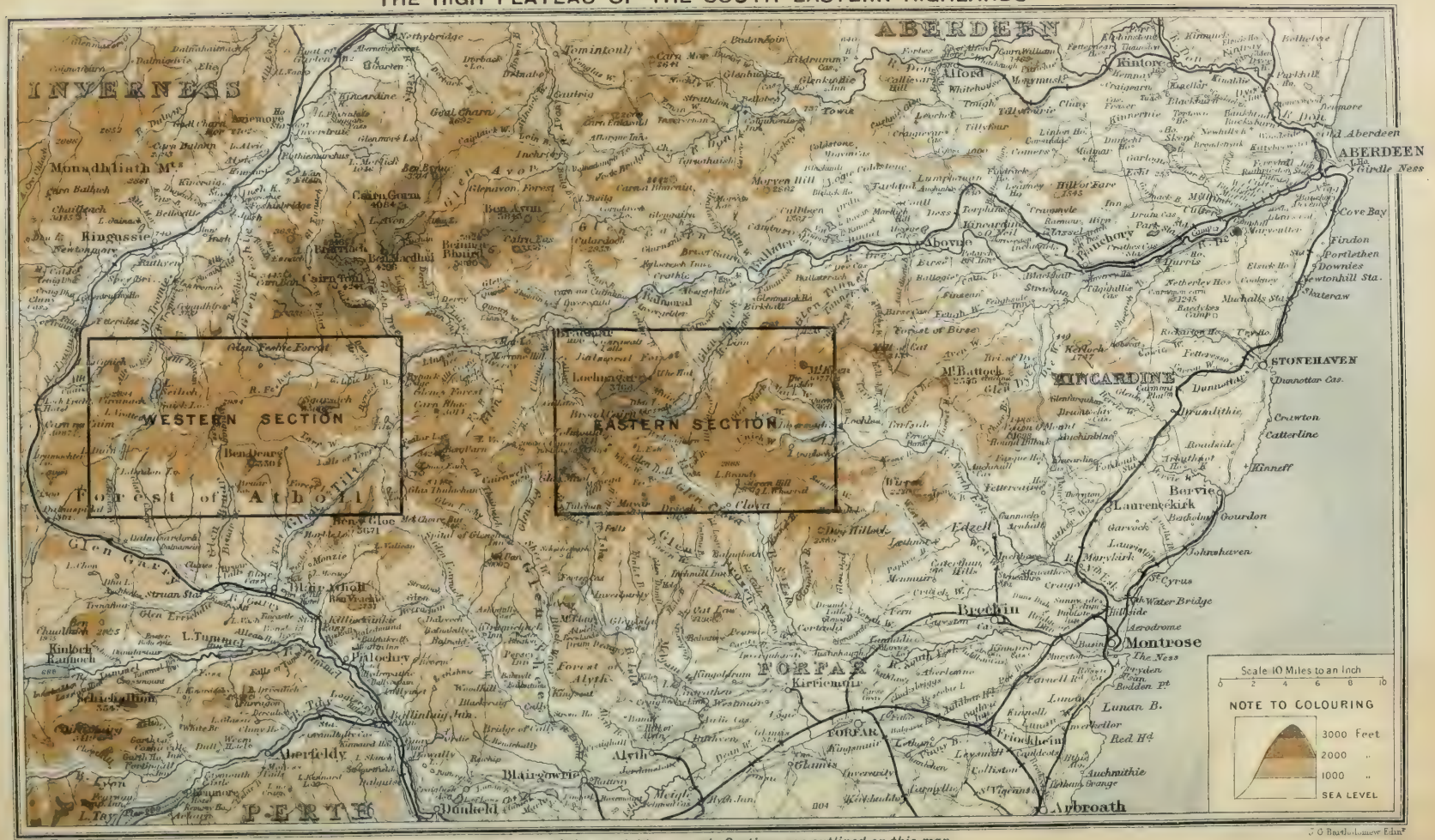
JAMES CRAIG

ORIGINAL PLAN OF THE NEW TOWN, 1767.


T R E E T
St Andrews
Square
T R E E T
St Laurence
Dundas
Property
Clellands Feu
Leith Street
Calton
Hill
Orchard
Hospital
Back of the Canongate
Grounds
Garden
Road to Leith
George Street is 100 Feet in Breadth viz 80 Feet in Carriageway & 10 Feet on each side for a Foot path
Queen Street, Princes Street, Frederick Street, Hanover Street, and Castle Street are 80 Feet in Breadth viz 60 Feet for a Carriageway, and 10 Feet on each side, for a Foot path
The Area between the Foot path and Buildings is 8 Feet
North Side of the High Street
P. Angus Sculp.

Patron of Every POLITE and LIBERAL
NORTH BRITAIN. One of the happy Consequences of the Peace Recently Concluded
Is Inscribed, By Permission, To His Majesty's
Most devoted Servant and Subject
JAMES CRAIG.

THE HIGH PLATEAU OF THE SOUTH-EASTERN HIGHLANDS



The Areas of the special large-scale Sections are outlined on this map

Scottish Geographical Magazine 1919

J. G. Bartholomew Edin.r

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

A GEOGRAPHICAL STUDY OF THE HIGH PLATEAU OF THE SOUTH-EASTERN HIGHLANDS.[1]

(*With Coloured Map, Sketch-Maps, and Sketches.*)

By ALEXANDER BREMNER, D.Sc., F.R.S.E.

THE main aim of this paper is to follow the story of part of the High Plateau of the Highlands and of its rivers *one stage* back into the past. It does not seem possible to go further back—or even so far, some may think—without entering the realms of pure speculation.

From the ridge—the Carn na Caim Ridge as it may be called from its highest summit—overlooking the Pass of Drumochter from the east, there extends to beyond Mt. Keen, a distance of fully fifty miles, a stretch of country, the greater part of which is contained within the 2000 ft. contour line. Lying roughly between 56° 50′ N. and 57° N., it may be traversed from west to east in an almost straight line without a descent below 2000 ft. except in crossing the narrow glens of the Tromie and Tilt. But for these breaks, the high ground is continuous: it forms in actual area—about 500 square miles—the most extensive connected mass of high ground in Britain, and occupies more than a third of the breadth of Scotland at that latitude. For convenience it may be called the *High Plateau of the South-eastern Highlands.*

[1] See for topography Sheets 64 and 65 of the one-inch Ordnance Survey Maps or Bartholomew's Reduced O. S. Maps, Sheets 16 (Braemar and Blair Atholl) and 17 (Aberdeen and Deeside), and the accompanying map; for geology Sheets 64 (colour-printed) and 65 (hand-coloured, price now prohibitive) or Sir A. Geikie's Geological Map of Scotland by Bartholomew. The author is indebted to the Carnegie Trust for a grant to cover the cost of the accompanying orographical map, and that of the drawing of the maps forming Figs. 1, 2, 3 and 4.

I.—Physiography.

Physically the plateau falls into three divisions (see coloured map).

1. *The Western Section* (Fig. 1), from the Carn na Caim Ridge to Glen Tilt (20 miles);
2. *The Central Section*, from Glen Tilt to the Glas Maol Ridge and the Callater Burn (11 miles).
3. *The Eastern Section* (Fig. 3), from the Glas Maol Ridge to beyond Mt. Keen (20 miles).

The Western Section.

On the north, this section terminates where, in the west, the ground falls towards the Spey and, in the east, rises to the still higher plateau of the Cairngorm monadnock:[1] on the south it is bounded by the valley of the Garry.

The greater part of the area is floored by rocks of the Moine series; the Ben Dearg granite mass, almost bisected by the Tarf, occupies a considerable extent of ground east and south-east of the centre; in the south-east is the Glen Tilt igneous complex; and the Glen Tilt fault and the features it gives rise to, form the geological and physiographical boundary on the east.

Towards the Garry the dip of the Moine rocks is east or south-east, and seems to have some influence on the direction of tributaries of that river: elsewhere no connection can be detected between the lie of the rocks and the flow of the rivers.

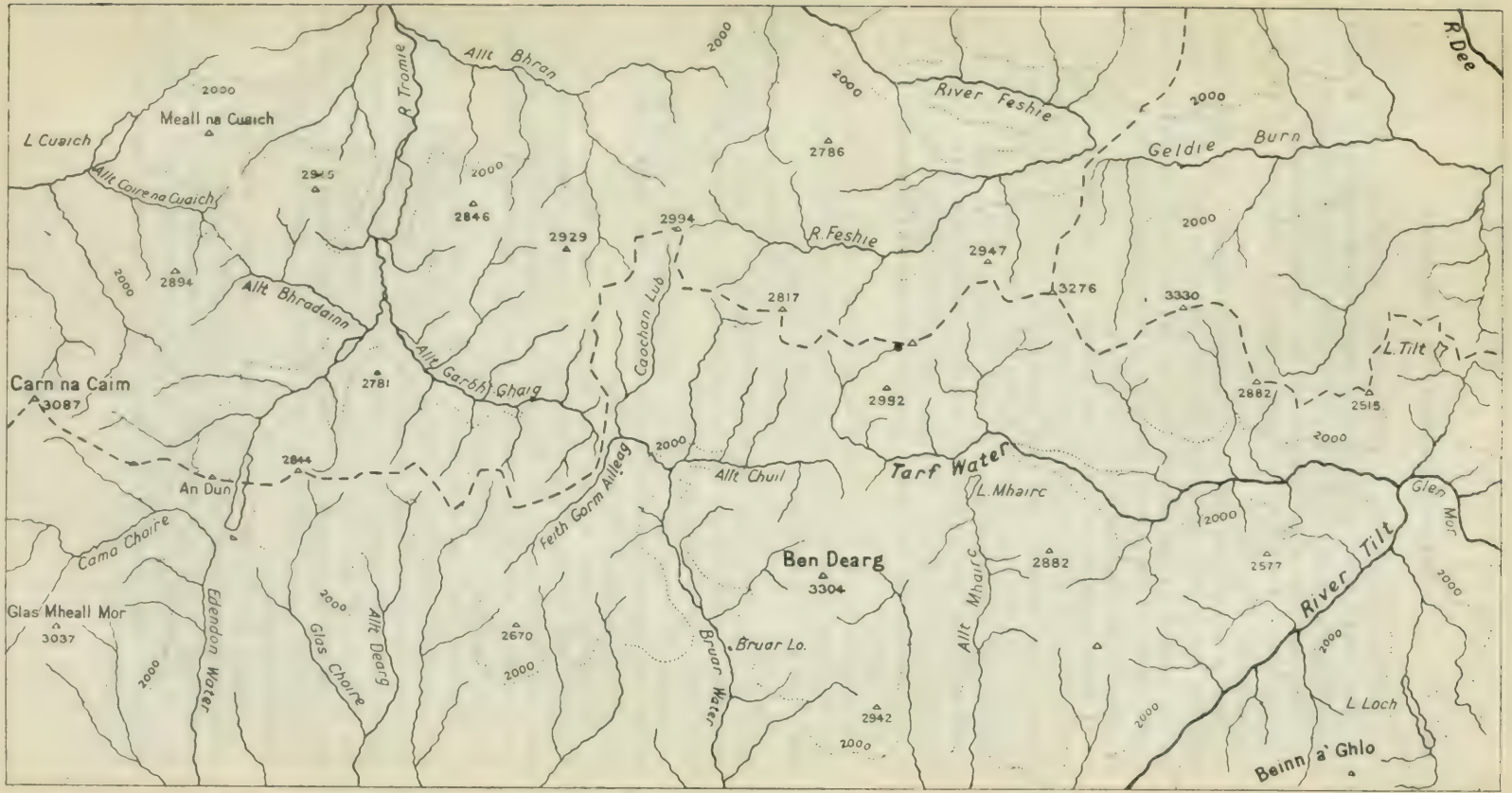
The highest summits on the plateau rise slightly above or fall somewhat below 3000 feet, and the average level of the surface is between 2250 and 2500 feet.

The plateau form is most typically developed about the headwaters of the Tromie (Gaick Forest), Edendon, and Bruar. Though in the eastern half several isolated summits rise above 3000 feet, there is a general fall in level from west to east.

In the north the eastward fall is clearly shown by the Feshie-Geldie valley; in the south it is somewhat obscured—on the map—by the present directions of some of the streams, but in past times the whole drainage seems to have passed towards the east (Fig. 2).

Any one who crosses the Minigaig Pass from the north can hardly fail to note one most suggestive feature of the view from where he begins the steep descent towards Glen Bruar and the Garry. For miles to right and left of the traveller extends a great, open hollow. Directly in front, its floor is trenched by a deep inner valley, the significance of which will be pointed out later; and there are others of like nature to the west: but the wide outer valley is seen to rise gently towards the

[1] This and other monadnocks are "relicts," *i.e.* they consist of specially resistant rocks that have survived the processes of degradation which reduced the rest of the Scottish area almost to sea level and produced the peneplain that, subsequently elevated and more or less cut up and modified by denudation, now constitutes the High Plateau. As the monadnocks originally rose above the peneplain, so they still overlook the plateau (see Fig. 9).



Bartholomew, Edin

FIG. 1.—Map showing the present drainage of the Western Section of the High Plateau of the SE. Highlands. Scale—1 cm. = 1 mile.

west and to sink as gently towards the east. There can be little doubt that this valley, like its neighbour to the north, was carved by a single eastward-flowing stream: the last eight miles of it are still occupied by the Tarf, the truncated remnant of its original occupant. To the original river, therefore, we may apply the name of its modern representative (Fig. 2).

This primeval Tarf has had a chequered history. On approaching the Glen Tilt fault it turned NNE. and joined the Dee; but its waters are now shared by five other rivers, and the story of river development in this section of the plateau, in so far as it can be deciphered, is mainly the story of the dismemberment of the Tarf.

If mere speculation were not barred, the suggestion might be hazarded that a river formed by the union of the upper Spey and the Spean (since reversed) was once continuous with the Geldie-Dee, the missing link lying over the site of the east-west portion of the Feshie. Whether this were so or not, since the elevation of the peneplain out of which Scotland has been carved, much denudation has taken place over plateau and valley alike. The Spey has lowered its bed many hundreds of feet, and this has led to two important events in the physical history of the region.

1. *Capture of the upper Geldie by the Feshie.*—This was described by Mr. Hinxman in this *Magazine* in 1901 (cp. *id.*, Nov. 1915): it is a clear, but by no means typical, case of river capture.

2. *Capture of the upper Tarf by the Tromie.*—Excavation of the Spey valley gave the Tromie an increasingly steep fall. The Tromie was able to undercut the Tarf, and the whole drainage of the area west of the Gaick lochs was diverted to the Spey.

Later, an obsequent tributary worked eastward along the Tarf valley, and captured all the tributaries of that river, as far east as the Feith Gorm Ailleag and Caochan Lub.

Of encroachment by the Feshie there is no doubt whatever: of encroachment by the Tromie, though it is of much more ancient date, there can be little; for the Gaick Forest plateau is highest along its northern edge and slopes towards what may reasonably be supposed to have been the old valley of the Tarf.

Meanwhile the old-established Garry was also deepening its valley, and north-bank tributaries were eating their way back into the High Plateau. Since the Garry is a transverse stream flowing across the dip of the Moine Schists and Flags, these tributaries (with the exception of the Tilt) are in the main strike streams; and no doubt their courses were partly determined by the existence of weak bands: but, viewed as a whole, they seem simply to have taken the shortest routes to the nearest low ground.

Though the Garry flows at a higher level than the Spey, the fall from the plateau towards it is shorter and steeper—about twice as steep. Accordingly where they come into direct competition for possession of the old Tarf basin, the tributaries of the Garry have now a distinct advantage over those of the Spey; and in two cases the biter has been bitten.

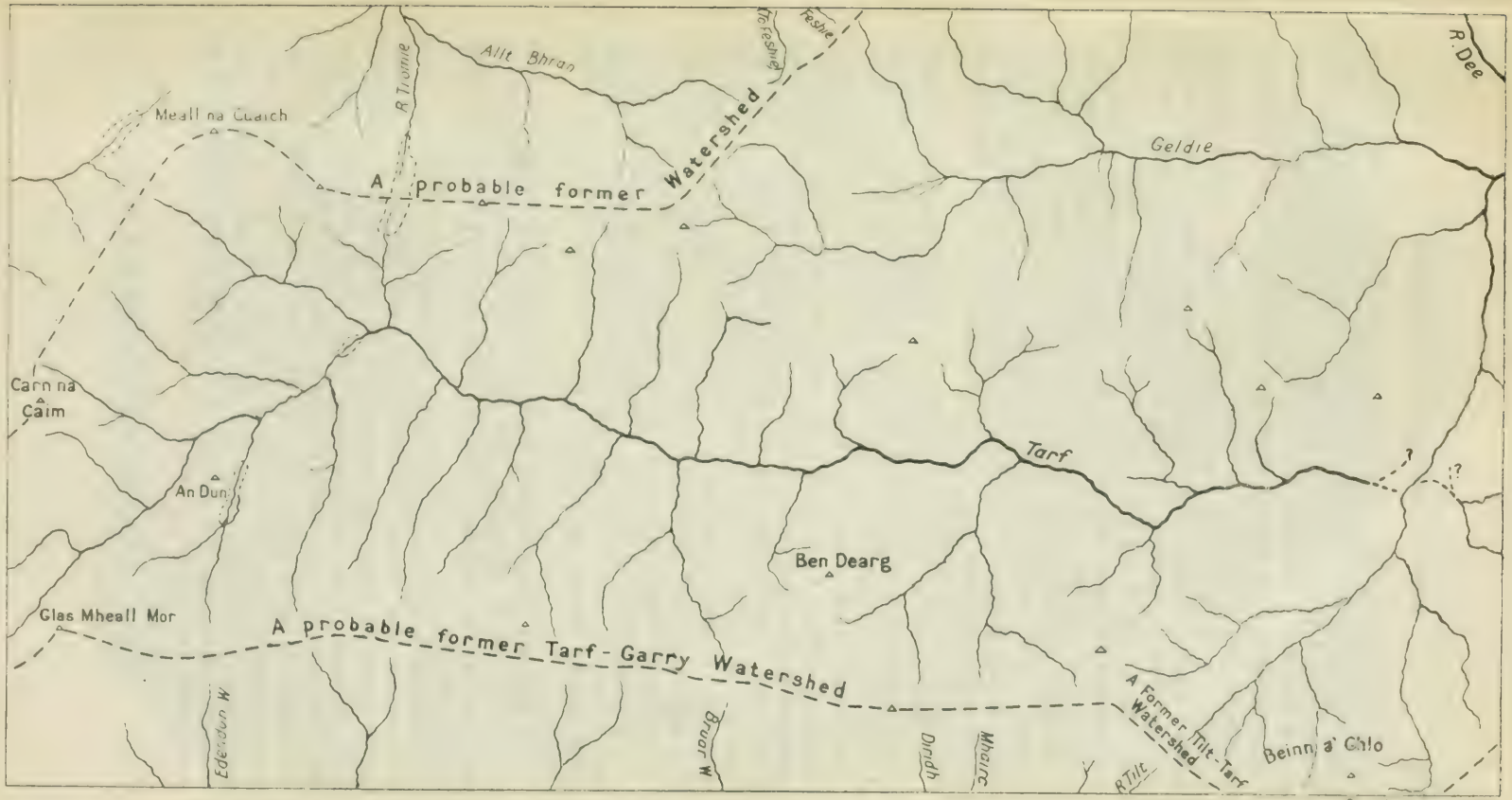


FIG. 2.—Map showing a former drainage of the Western Section of the High Plateau of the SE Highlands. Scale—1 cm = 1 mile.

1. *Capture of the Allt a Chama' Choire by the Edendon Water.*—There seems little doubt that the Allt a Chama' Choire, both before and after invasion of the area by the Tromie, flowed through the hollow to the west of An Dun. By virtue of its steeper fall the Edendon has been able to encroach upon the territory previously annexed by the Tromie and capture part of the chief stream in it.

The valley from Loch an Dun to Loch an t' Seilich is most peculiar. It was deepened in the first instance by the conquering Tromie, acting doubtless along pre-existing drainage lines; and, at its southern end, by headward erosion of the Edendon. But its present remarkable depth and characteristic cross-section are, in the main, the result of ice action.[1] Erosion at various stages of the Ice Age, both by meltwater and by ice, is certainly responsible for its peculiar features: Loch an t' Seilich occupies a rock basin. The precise position in this valley of the preglacial Tromie-Edendon watershed it is impossible to determine. There is little doubt, however, that the Allt a Chama' Choire had been filched from the Tromie in preglacial times.

2. *Captures by the Bruar from the Tarf and Tromie.*—Study of the map alone is sufficient to convince any one that the drainage about the head of Glen Bruar is abnormal.[2] In its lower part the basin of the Bruar is singularly narrow, and the river receives only a few insignificant feeders. North of Bruar Lodge the basin suddenly widens, and there converges on the head of the Glen the drainage of a considerable extent of country. The drainage lines, too, exhibit what, to borrow a botanical term, may be described as a "pedate" arrangement. The only rational explanation of these phenomena is river capture: the streams that fall from north and south into the two branches of the Bruar were originally tributaries developed on the sides of the ancient Tarf valley.

Working back into the High Plateau, the Bruar invaded the central part of the old Tarf valley, less than a mile to the east of the farthest point reached by the obsequent branch of the Tromie, the Allt Garbh Ghaig.

At first the Bruar received little, if any, accession to the volume of its waters; but an obsequent, the Allt a Chuil, working towards the east, inverted and captured the tributaries belonging to two and a half miles of the Tarf.

A tributary, probably representing the headwaters of the Tarf after truncation by the Tromie, worked westward and captured from the Allt Garbh Ghaig its latest acquisitions, (1) the Caochan Lub and (2) the Feith Ailleag. These captures have taken place much more recently than those made by the eastern branch of the Bruar, the Allt a Chuil. The volume of water coming down to the head of Glen Bruar from the west is greater than that of the Allt a Chuil, and yet it flows on a gradient twice as steep—400 feet per mile. There is indeed some reason to believe that the capture of the Feith Gorm Ailleag may be post-glacial, and that *further captures are impending.*

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[1] *Mem. of Geol. Survey, Explanation of Sheet* 64, pp. 9, 101, 104.
[2] *Loc. cit. sup.*, p. 8.

The back-set direction of the right-bank tributary, the second in order from the head of Glen Bruar, suggests that, before the intrusion of the Bruar, this stream flowed to join the Tarf. If so, we have some indication of the distance to which the watershed of the Garry has here been pushed to the north.

One may note that between the Edendon and the Bruar five streams descend from the watershed towards the Garry, and each has its counterpart or opposing stream flowing northward in the same line. The advantage of slope is in every case with the streams that make for the Garry; and this advantage must have been much greater before the extraordinary glacial deepening of the Allt Loch an Duin and Allt Garbh Ghaig valleys. Consequently the watershed has receded northward and is notched by high-level through valleys,[1] one (Carr na Moine) nearly 500 feet deep. Capture of territory has proceeded, though it is not testified to by striking evidence of river capture.

The Edendon and Allt Loch an Duin form a similar opposing pair: their through valley, however, has been greatly modified by glacial action, as doubtless the other through valleys have been in a less degree.

The Bruar has proceeded a good deal further than any of its neighbours on the west: it has not only captured and inverted a south bank tributary of the Tarf, but invaded the main valley of its high-level neighbour.

It may also be noted that along its western margin the plateau has been similarly encroached upon: in particular the Allt Bhradainn (Vrottan), whose valley is the direct continuation of that of the ancient Tarf, has suffered curtailment by a tributary of the Truim.

Relations of the Mhairc and Tarf.—At first sight it would seem from the map that the Mhairc, a tributary of the Tilt, has captured a small feeder of the Tarf. But the Mhairc for nearly two miles below what should be the elbow of capture has an extraordinarily gentle gradient and looks like anything but a truculent pirate.

I regret that, when I studied the ground, all the considerations involved were not present to my mind. But the following explanation may be suggested of the undoubtedly peculiar features here displayed.

In preglacial times the back-set tributary that joins the Mhairc below the loch was a feeder of the Tarf. It flowed north-east, and was joined by a stream that followed in the reverse direction the line of the upper Mhairc. Loch Mhairc rests on a sheet of boulder clay blocking the valley of the conjoined streams.

The direction of what is now the upper Mhairc, the slow-flowing section referred to above, has been reversed by a double process—(1) accumulation of boulder clay in the lower part of its valley; and (2) glacial erosion of a low col at its head—a col in a through valley.

Between 2 and 2·8 miles below the loch the stream drops 500 feet (*i.e.* 625 feet per mile). This torrential descent marks approximately the limit reached by the headward erosion of the preglacial Mhairc.

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[1] Through valleys, therefore, may be formed in several ways. Cf. *Mem. of Geol. Survey, Geology of Ben Nevis and Glen Coe*, p. 4, and authorities there cited.

As a possible explanation of part of the phenomena, another suggestion may be made, viz., that Loch Mhairc rests in a portion of the preglacial valley of the Tarf on an infilling of boulder clay, and that the Tarf has been diverted to the north (where it runs for some distance on rock). But without further study of the ground, it is not possible to do more than simply suggest this view; and the ground is difficult to reach.

That there is difficulty in finding a reasonable explanation of the relations of the Tarf and Mhairc is evident from the fact that in the *Memoirs of the Geological Survey, Explanation of Sheet* 64, two apparently contradictory explanations are offered, one on p. 5 and the other on p. 105.

One of the head streams of the Allt Diridh (a feeder of the Mhairc) —that rising on the south-east shoulder of Ben Dearg—has the same direction as the back-set tributary of the Mhairc mentioned above: this may point to capture by the Diridh in the more remote past.

Capture of the Tarf by the Tilt.—The capture by the Tilt of the Tarf, or rather of the Tarf basin—for only a small fraction of the original basin now drains to the Dee—has been described more than once.[1]

The conviction that this is one of the clearest, most typical, and most impressive[2]—certainly the most impressive in the British Isles—cases of river capture hitherto recorded has grown stronger during the twenty years that have elapsed since I first studied it. Though capture is of preglacial date, it may be said (with some slight reservations) to possess all the marks of comparatively recent occurrence: indeed the final phase, the annexation of the Allt an Ruidh Ghil, is probably post-glacial, for the watershed was till quite recently in an unstable condition.

But to deal adequately with the process of capture and the subsequent physiographical modifications of the region (which have never been fully described) would require a separate article. At present I wish simply to emphasise the fact of capture and the extent of territory captured: the latter may be recognised by noting on the map how far the watershed has been shifted towards the north, at one point nearly seven miles.[3]

The Central Section.

The Central Section is a region of varied geological structure. The interfolded quartzites, black schists, and limestones, of which it is mainly built, offer very unequal resistance to denuding agents. The result is that we find here an area in which streams are adjusted to structure, or as well adjusted as they can be expected to be among highly folded

[1] *Physical Geology of the Dee Valley*: Aberdeen University Press. 1912. *Mem. of Geol. Survey, Explanation of Sheet* 64, 1912.

[2] The only equally clear, though much less impressive, case I am acquainted with occurs in North Wales. The Afon Brysor, a stream draining west to the Irish Sea, has captured a part of the upper basin of the Afon Tryweryn, which flows between the two Arenigs to join the Dee at Bala.

[3] The Tilt was originally a feeder of the Mhairc: the lower part of Glen Tilt is directly in line with Glen Mhairc. The Tilt outgrew its parent by finding a line of little resistance along the Glen Tilt fault.

rocks. The ridges and all the highest summits are on the strong quartzites; the valleys, except for short distances, are on the weak schists and limestones. The Connie and Ey, for example, follow the softer schists for miles; the Clunie and its two branches flow over the same rocks. The Callater Burn takes a north-west course, principally across black schists and limestones, and it may be noted that it skirts closely the margin of the granite of the Lochnagar monadnock (imitating the lower Feshie and middle Quoich in that respect). The Glen More Burn, a tributary of the Tilt, keeps in the main to weak rocks. In their upper reaches the streams that flow southward are like their neighbours across the watershed: in their lower courses (beyond and below the 2000 feet line) they cross the grain of the country and take the shortest routes to the low ground of Strathmore.

All the rivers of the Central Section of the plateau are therefore subsequents developed on weak rocks. Except for slight irregularities mainly attributable to glaciation, they possess comparatively low and even grades, and the region is sub-maturely dissected, *i.e.* the difference in level between valley bottom and mountain ridge is about as great as it is ever likely to be.

The high-level hollow, crossed diagonally by the Dee-Tay watershed and containing the sources of four important streams, has been worn down on black schists.

The original plateau nature of the surface is very clearly shown by the long quartzite ridges that extend for miles with remarkable uniformity of level. Curiously enough, though the plateau is here so much cut up, the average summit level is as great as in the Western Section; and there are more peaks rising over 3000 feet.

From the Beinn a Ghlo mass (quartzite) denudation has removed almost all trace of the original plateau. This graceful group of mountains, moreover, is isolated from the Central Section, to which it geologically belongs, by a through valley. The watershed between the An Lochan flowing northward and the Glen Loch Burn flowing southward is very flat. A through valley eroded by opposing streams (principally by the An Lochan) has been modified, not formed, by glacial erosion; and the watershed, doubtless originally low because on weak rocks, has been lowered still further so that one crosses it without being aware of the fact. It may be noted that the Loch Loch valley is the only one that does not hang markedly above Glen Tilt.[1]

The Eastern Section.

At the Glas Maol Ridge we enter a region which in physical features and geological structure offers a marked contrast to the Central Section. The general uniformity of geological structure and of the resistance offered by the rocks to denuding agents is reflected in uniformity of surface. Gneisses of various kinds, granites, and diorites occupy the greater part of the ground: the granites form the Lochnagar and Mt. Keen monadnocks.

[1] *Mem. of Geol. Survey, Explanation of Sheet* 64, p. 106.

Around the heads of the Callater, Isla, and South Esk, the one-inch map shows clearly the plateau character of the ground; the same feature is well marked over all the area east of Glen Clova. Viewed from the west shoulder of Mt. Keen, the whole country as far as the Glas Maol Ridge is seen to be one undulating, eastward-sloping plateau interrupted by the great chasm of Glen Clova, which from this point seems not a dominant but an accidental feature of the landscape.

To the north-east of Glen Clova we everywhere encounter well-opened valleys, low divides, and gentle slopes. There is flatter ground to be found all over this part of the plateau than one can find elsewhere in the Highlands at anything like an equal elevation. As far as gradients are concerned, one could ride a push bicycle over the greater part of the area. There is, indeed, one part—near the watershed between the Muick on one side and the Mark and Tanner on the other—where a person can walk fully eight miles in a nearly dead straight line without ascending above, or sinking below, his starting-point more than a hundred feet. These characters indicate an old land-surface worn down to comparatively featureless uniformity by prolonged denudation.

As regards drainage, one remarkable feature of this region is the extremely devious, though on the whole eastward,[1] tracks followed by the Mark, Lee, and Unich before their union at the head of Glenesk (Fig. 3).

While the interstream spaces maintain unbroken—and even exhibit in a specially marked manner—the plateau character common to the whole area, the Mark and Lee, when followed eastward, are found to flow in ever-deepening glens: and near Invermark Lodge they are over 1100 feet below the plateau level. This feature is not entirely due to the glacial deepening that has certainly occurred on both above their junction, witness the great Loch Lee trough. The trunk stream, the North Esk, formed by the union of the Mark, Unich, Lee, and smaller streams, has by ordinary fluviatile erosion cut downward and backward, and given its winding headwaters on the plateau (in which it has scooped out a great embayment) an ever-sinking local base-level to work to. We see, in fact, an early stage of the process by which the plateau will in the end be dissected and destroyed. The region has passed through at least one cycle of erosion, that in which the undulating plateau surface was produced; and has now entered on a second, in which the old, winding streams established during, and surviving from, the first are being gradually rejuvenated and have begun to dissect the old peneplain.

It should also be noted that all the streams draining to Glenesk are entirely independent of geological structure, and that all the chief rise on the very brink of Glen Clova. This last point confirms what is suggested by the general slope of the entire area from Glas Maol eastward—that the South Esk is a comparatively late intruder which has

[1] Glenesk also continues this easterly trend till the river turns aside to breach at right angles the resistant rocks of the Highland border.

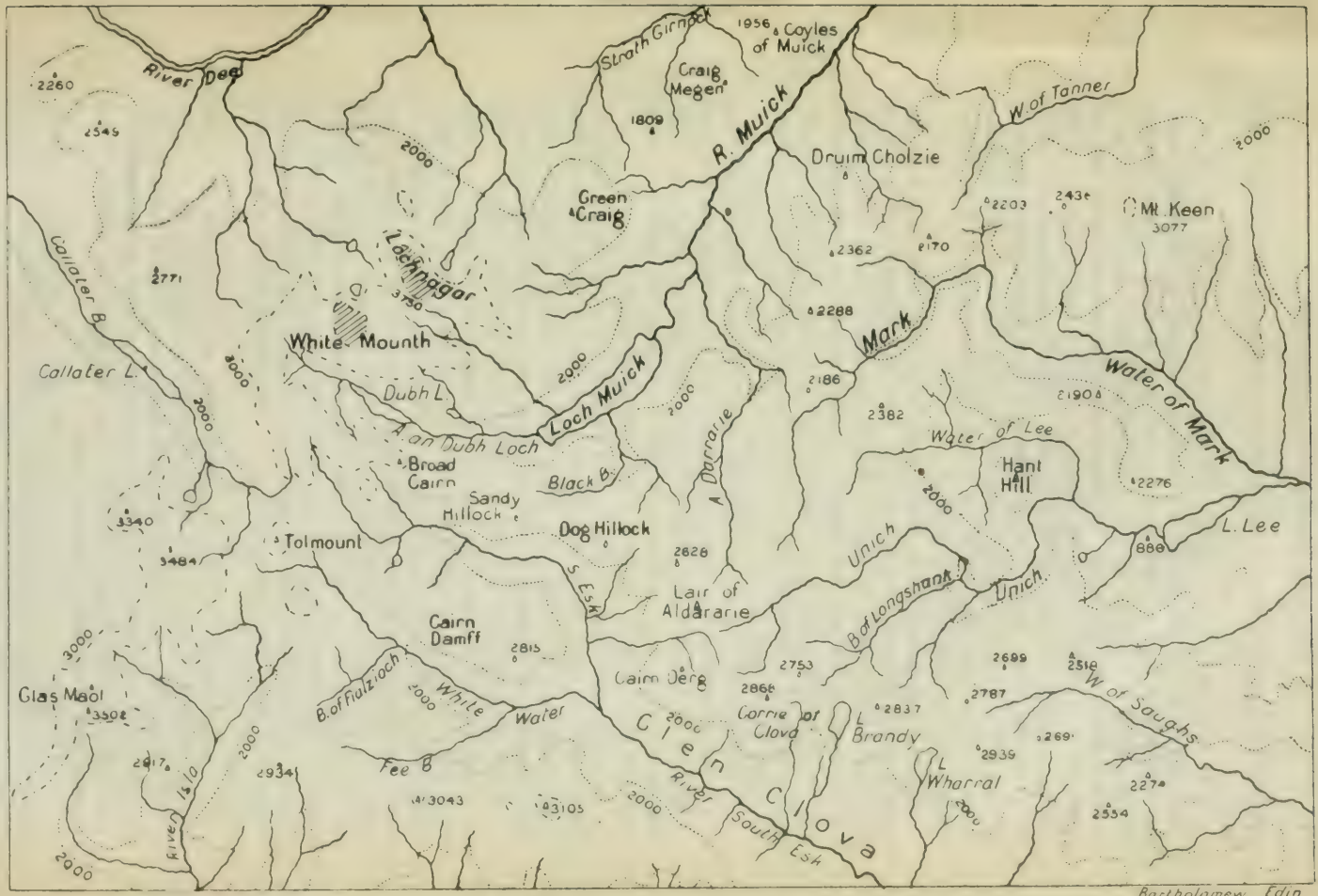

Fig. 3 Map showing the present drainage of the Eastern Section of the High Plateau of the SE. Highlands. Scale—1 cm. = 1 mile.

encroached upon the headwaters of streams belonging to the North Esk basin.

1. *Encroachment by the South Esk and probable original Drainage.*—Throughout its course within the region occupied by Highland rocks the South Esk has—if we exclude the area drained by the Prosen, which enters Strathmore as an independent stream and was probably annexed there by its larger neighbour—a very narrow basin: for ten miles below Glendoll Lodge it does not average three miles in width, and is practically co-extensive with the glacially overdeepened trench in which the river flows. Above Glendoll Lodge the basin suddenly widens, and numerous streams come in from the plateau to the west and north-west. In this particular the South Esk resembles the Tilt, Bruar, Tromie, and other successful pirates.

Everything points to the South Esk having cut back into, and captured part of, the eastward drainage of the High Plateau. It has done so, not (like the Tilt) by rapidly eating backward along weak rocks, but because (cf. Tromie and Bruar) it has managed by slow headward erosion of strong rocks to invade the plateau area and offer the east-flowing streams a shorter route to the low ground of Strathmore than could the North Esk.

Like those of the South Esk, the headwaters of the Callater and Isla have encroached upon the plateau, and may be responsible for some truncation of the streams that now converge at Glendoll Lodge: the compound corries in which Glen Callater and Glen Isla head are pushed well back into the plateau east of the Glas Maol Ridge.

Any reconstruction of the former drainage of the area invaded by the South Esk must be to some extent speculative; but the considerations stated above—and there are others still to be advanced—show that reconstruction need not be based on mere groundless supposition.

If one stand near the county boundary line (Aberdeen-Forfar) in the dip of the plateau between Round Hill of Mark and Hill 2288, and look westward, the gorge of the Allt Darrarie and the gloomy depression in which lies Loch Muick are invisible. From the observer's station a broad, seemingly unbroken hollow rises westward to the great high-level valley between Broad Cairn and White Mounth drained by the Allt an Dubh Loch: to the left the present headstream of the Mark is seen coming down from due south. The conclusion can hardly be resisted that the Allt an Dubh Loch once followed this hollow into Glen Mark, and that the upper section of the Mark was a south-bank tributary.

On the strength of the foregoing facts one may venture on the following reconstruction of an earlier drainage system (Fig. 4).

(1) The *Allt an Dubh Loch* followed the present line of Loch Muick, curved round over the site of the Darrarie gorge, and passed north of Round Hill of Mark into Glen Mark. The upper sections of the present Darrarie and Mark were tributary to it.

(2) The *Burn of Fialzioch*—the upper part of its original basin is now occupied by the corries at the head of Glen Isla—flowed north-west of Cairn Damff, and, being joined by what are now the headstreams of

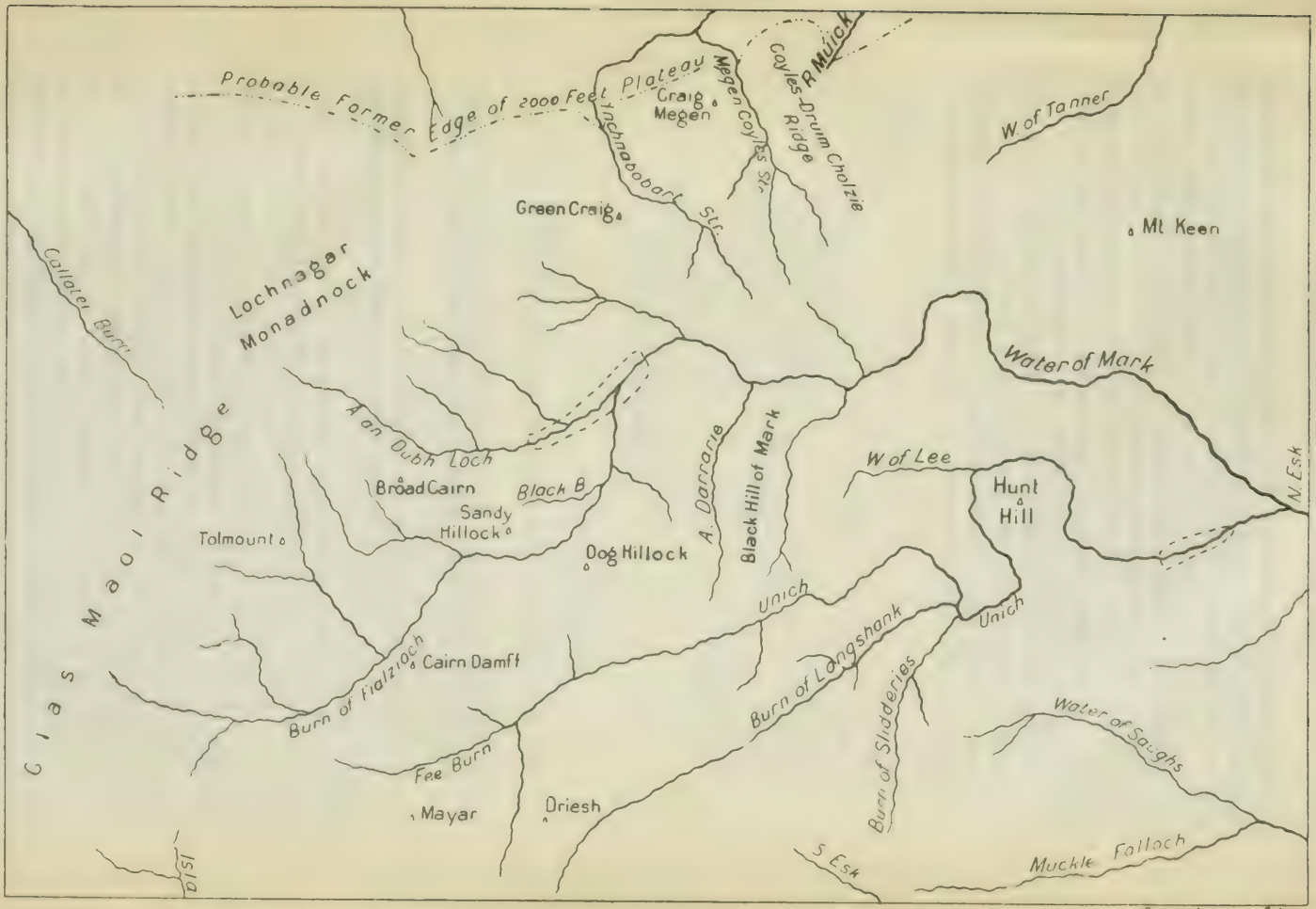

FIG. 4. Map showing a former drainage of the Eastern Section of the High Plateau of the SE. Highlands. Scale - 1 cm. = 1 mile.

the White Water and South Esk, curved east and then north-east between Sandy Hillock and Dog Hillock, and so passed through the wide hollow now occupied by the Black Burn to join the Allt an Dubh Loch. One should, however, rather say it was joined by the Allt an Dubh Loch; for, if this reconstruction be correct, the Fialzioch was by a good deal the more important stream.

(3) The *Fee Burn* (which, like the Fialzioch, has lost territory to the Isla) was continued eastward between Lair of Aldarrarie and Cairn Derg, and formed the upper part of the Water of Unich.

(4) The *Burn of Longshank* has, as late as glacial times, been truncated by the development of the Corrie of Clova.

Such, it would seem, was the drainage system broken into from the south-east by the Esk. Streams (4), (3), and (2) were successively

FIG. 5.—View up Glen Mark from near the Queen's Well.

captured by the South Esk; and the White Water subsequently tapped (2) higher up, leaving the deep wind-gap north-west of Cairn Damff.

2. *Encroachment by Tributaries of the Dee.*

Progressive deepening of the valley of the Dee enabled tributaries of that river to cut back into, and capture part of, the drainage of the High Plateau.

The Callater has already been dealt with (p. 339); it has invaded only a small part of the typical plateau area, the upper part of the White Water basin.

East of the Lochnagar monadnock, the earliest intruder was the Girnock, whose wide valley bears evident marks of age.

On the watershed between Glen Girnock and Glen Muick are two pronounced wind-gaps. The first, the *Inchnabobart Gap*, situated between Green Craig and Craig of Inchnabobart, has an elevation of 1450± feet: it is about 150 feet above the nearest point on the Muick. The second, the *Megen-Coyles Gap*, situated between Craig Megen and the Coyles of Muick, sinks as low as 1220± feet, *i.e.* not more than 40 feet above the Muick. These gaps once carried streams that had eaten back into the High Plateau south of the Dee. The Allt an Uisge and Allt

an t' Sneachda probably represent head branches of the Megen-Coyles stream, while the Allt an Bhealaich Odhair (between the Creag na Slowrie and Cul nan Gad ridges) formed the headwaters of the Inchnabobart stream.

A branch of the Megen-Coyles stream captured the Inchnabobart stream ; and the successful pirate finally succeeded in carrying off what, after the depredations of the South Esk, was the headstream of the Mark, the Allt an Dubh Loch.

Meanwhile a stream that occupied what is now lower Glen Muick was gradually cutting south-westward through the Coyles-Druim Cholzie

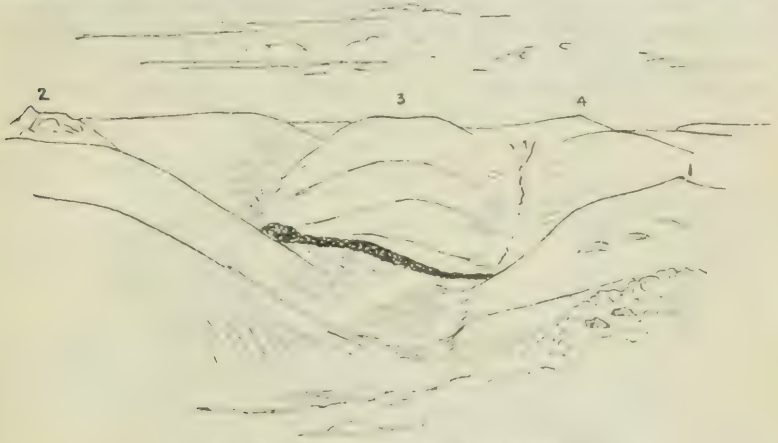

FIG. 6. Megen-Coyles Gap from NNW.

1 = Craig Megen. 2 = Coyles of Muick.
3 = Druim Cholzie with Allt an t' Sneachda to right and Allt Cholzie to left.
4 = Fasheilach.

The Girnock is seen in the foreground : the falls and gorge of the Muick are within the wood in the middle distance : the edge of the High Plateau forms the sky-line.

(or Whillie) ridge : it finally captured the Megen-Coyles stream, and the present drainage system was established.

There can be little doubt that at no very distant date (geologically speaking) the upper Muick flowed through the Megen-Coyles Gap.. Below the elbow of capture there is a conspicuous gorge, near the lower end of which is the picturesque Linn of Muick : above the elbow the gorge that once existed has been obliterated by glacial erosion : and to that cause also is to be attributed the great width and depth of upper Glen Muick (including the loch, a true rock basin). The gap is so little elevated above the present level of the Muick that, even when allowance is made for its deepening in glacial times by ice-erosion and by the action of meltwater,[1] diversion must be comparatively recent.

[1] During the later phases of glaciation a stream of meltwater passed by this route from the Muick ice into Glen Girnock, but fluvio-glacial and morainic stuff, not rock, floor the gap : during the earlier phases the ice certainly moved across, not through, the gap.

It has already been suggested that the Allt an Dubh Loch-Mark received as tributary the present upper Allt Durrarie. After capture of the Allt an Dubh Loch an obsequent stream was developed that began the excavation of the striking Darrarie gorge. This obsequent captured the upper Allt Darrarie, which till that time had continued to flow between Hills 2168 and 2288 into Glen Mark.

Glacial erosion of Glen Muick gave additional power to the Darrarie; and deepening of the gorge proceeded apace and is still going on, for the basin of the Darrarie hangs markedly above the flat valley floor east of Loch Muick. The next phase of river development in this locality is likely to be capture of the upper Mark by the small stream that has been thrown out from the head of the Darrarie gorge. The Mark, however, may deepen its valley fast enough to avoid being undercut; but the law of unequal slopes is in favour of the Darrarie. Moreover,

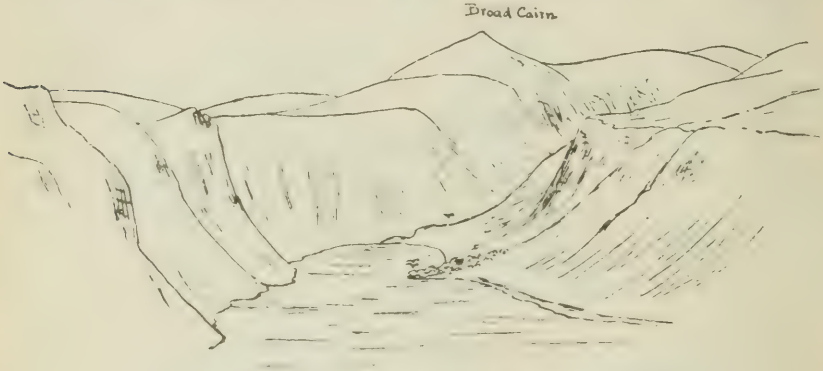

FIG. 7. – Head of Loch Muick.

– – = Allt an Dubh Loch. = = Delta of the Glas Allt.

all the other right bank tributaries of the Muick are, by reason of their steep gradients, encroaching upon the plateau area.

For years I have searched in vain for an unequivocal case of *post-glacial river capture* and examined many probable cases, but the trail of ice was over them all: the Geldie, Slugain, and Tarf are cases in point. The map seemed to suggest that in the area under discussion there might really be one such case, and that a case doubly interesting as being an example of the capture and short-circuiting of a river by one of its own small tributaries.

The Water of Unich (which, being much longer than the Lee, is really the main stream) drops from the plateau into Glen Lee by a series of picturesque falls and water-slides, descending 800 feet in something like a mile. There is not the slightest doubt that the Unich once followed the wide valley to the west of Hunt Hill, and that it joined forces with the Lee 2·5 miles above their present point of union.

The gap between Hunt Hill and Craig Maskeldie, now traversed by the Unich, must have been one of the main avenues through which, in

late glacial times, ice poured from the snow and ice fields of the High Plateau into the glacier trough of Glen Lee.

When the ice disappeared, the Unich took the glacially eroded track prepared for it under the shadow of Craig Maskeldie. As far as I was able to judge on a recent visit, there is no evidence of recent river capture—no alluvium and certainly no deserted river channel—in the line of the old valley below the elbow.

Apparently this is not a case of normal capture through headward erosion by a piratical stream. Neither is there anything to show that the Unich has been turned out of its preglacial course by a barrier of drift. This seems rather to be an example of capture or short-circuiting of a river by glacial erosion. Hunt Hill may be compared to a severed

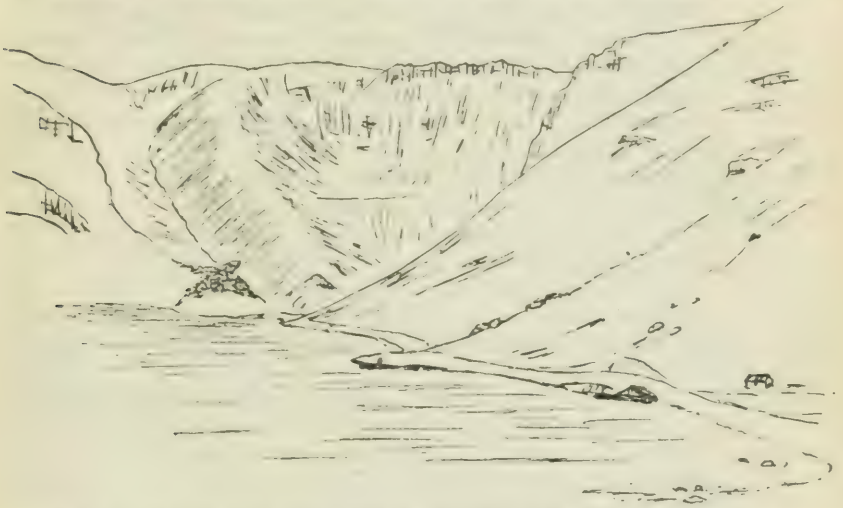

Fig. 8. Loch Lee from the old church of Lochlee: Craig Maskeldie with Corrie of Carlochy in the background.

spur, but the cutting of the neck of the spur is a result of glacial, not fluviatile, erosion. The case seems sufficiently peculiar to deserve special mention.

Among many minor features characteristic of the High Plateau of which mention might be made, perhaps the most interesting are the *hanging valleys*. They are scattered almost broadcast over the whole of the region under discussion, from the extreme east to the extreme west. Among them are to be found valleys that exemplify pretty nearly every conceivable cause to which "hang" may be ascribed. But in most cases more than one cause has been in operation, and there might be considerable difference of opinion as to that to which most weight should be given in any particular instance, while to give arguments *pro* and *con* would be tedious. It may, however, be useful to state briefly the causes that seem to have operated in the formation of the hanging valleys of the region, and to give a few illustrative examples.

These valleys, then, hang because of—

1. Recent[1] (not necessarily post-glacial) capture or diversion.

(*a*) When a stream sends out a tributary that captures a neighbour flowing at a higher level, the valley of the latter hangs over that of the former, *e.g.* Allt Darrarie[2] (as its history is interpreted in the foregoing pages), Feith Gorm Ailleag, Caochan Lub.

(*b*) When a main stream is captured and its *velocity* and cutting power increased on the steeper gradient now acquired, its tributaries are for a time unable to keep pace with it and join it from hanging valleys, *e.g.* the small tributaries that enter the Tarf for two miles above its junction with the Tilt. (This is not apparent from the map, though on the ground it is.)

(*c*) When a stream has suffered diversion by glacial agency into a shorter and steeper path, its valley hangs over that into which the diversion has taken place, *e.g.* Water of Unich, diverted into Glen Lee; possibly also the upper Mhairc (see p. 337).

2. Deepening of the valley of the tributary not keeping pace with that of the valley of the main stream because of—

(*a*) Permanent increase in *volume* of the main stream by recent[1] captures above the point of entry of the tributary, *e.g.* (in great part) the valleys hanging over Glen Tilt below the entrance of the Tarf and Glen More Burn; so possibly, in part, the hanging valleys of the middle Feshie from Craig na Caillich to the Eidart (see also 2, *b* and *c*).

(*b*) Temporary increase in *volume* of the main stream through discharge down it of meltwater from ice mainly supplied from snowfields outside its valley, *e.g.* hanging valleys of the Loch an Duin-Loch an t'Seilich hollow, the hanging valleys of Glen Tilt (in part), and possibly of middle Glen Feshie (in part).

(*c*) Excess of glacial erosion in the main valley over that in the tributary valley—the commonest, but by no means only, cause, *e.g.* the valleys of all the tributaries that flow from the High Plateau into the corries at the heads of the South Esk, White Water, Isla, and Callater; the major part of the "hang" of all the valleys that open on Loch Muick; the hanging valleys of middle Glen Feshie (in part).[3]

3. Widening[4] of the main valley by glaciers. The lower part of the tributary valley is cut away, and its stream cascades into the main valley, *e.g.* Glas Allt, Allt Dearg, and Black Burn (Loch Muick); the streams that enter Loch Loch and the Allt an Lochan from Beinn

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[1] The discordant junctions of tributary and main stream produced in the ways specified persists for a (geologically) short time: hence the qualification "recent."

[2] The Allt Darrarie gorge, as is shown by ice-worn rocks, was partly excavated in pre-glacial times; and the stream then as now entered the Muick from a hanging valley.

[3] Cp. *Mem. of Geol. Survey, Explanation of Sheet* 64, p. 3 and plate ii.

[4] Almost invariably accompanied by deepening (2 *c* above).

a Ghlo, and most of those that join the South Esk in Glen Clova. In Glen Clova the hanging valleys are corries.

Even when its capture has taken place in comparatively recent times a stream may make an accordant junction with its captor and yet enter from a hanging valley. The Glen More Burn exemplifies this: it has trenched an imposing gorge on the floor of a wide valley that is accordant with the old Tarf valley, but hangs markedly above that of the upper Tilt (Allt Garbh Buidhe).

The junction of the Tarf, a more powerful stream than the Glen More Burn, shows marked discordance, even though a considerable gorge has been cut in the bottom of its hanging valley. Does the difference

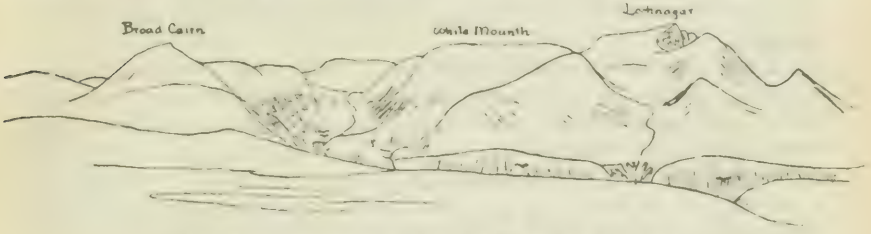

Fig. 9. Lochnagar Massif from the Capel Mounth Path.
~~ = Loch Muick Trough. == = Dubh Loch.

in the nature of the rocks traversed by the two streams entirely explain this difference in their behaviour? A study of the upstream V's made by the 1500 feet contour on the Tarf, An Lochan, Glen More Burn and Allt Garbh Buidhe raises some interesting problems.

II.—Human Geography.

The population of the plateau area is exceedingly sparse. Practically the whole is deer forest; and, apart from a few sheep-farms in Glen Clova, Glen Esk, and Glen Clunie, there is not within it a single human habitation that is not a shooting-lodge or a gamekeeper's house.

As a war measure, sheep have been pastured in some of the glens and on the lower parts of the plateau itself. In former times, most of the glens furnished summer pasture for sheep and, in some places, for cattle. In the ruined homesteads to be found in all the larger glens, we have ample testimony that the area once supported a considerably larger population than it now does. It would be at least interesting to have, not a jeremiad over the depopulation of our Highland glens, but an exact record of its causes and extent and of the stages by which it has taken place.

Except where they have been planted as shelter for game or for houses, there are few trees. In Canlochan and Canness glens, at the head of the Isla, the plantations extend up to the 2000 feet contour, but this is on ground with a southerly aspect. In the larger valleys

afforestation should be possible: the greatest drawback would be the high winds that sweep down from the plateau.

In the streams of the plateau there is a large reserve of water-power that may some day be turned to account.

But as regards human geography the most important point in connection with the plateau is the way in which it has controlled communication.

The High Plateau, falling towards Strathmore in a long, river-seamed slope (a greatly dissected and considerably degraded portion of the formerly much more extensive plateau), and the hilly ground that continues it eastward to the coast of Kincardineshire, form a triangular area bounded by the Garry-Tay, Strathmore and the Dee valley. The main lines of communication necessarily follow the sides of the triangle.

Along most of the northern border the valley of the Dee provides an east-west route. A practicable, but in some places difficult, through route into upper Strathspey, by way of the Geldie and Feshie, has never been much used even as a drove road; and the Dee valley was and is, as far as *direct* communication with the west is concerned, a *cul de sac*. It has been proposed to convert the above-mentioned path into a carriage road and so provide a through route for tourist traffic.

The chief lines of communication, then, skirt the plateau area and converge on Perth and Aberdeen; to this is due much of the importance of these towns, particularly of Aberdeen, as trade-centres.

Only one road practicable for *light* wheeled traffic crosses the High Plateau proper. This is the Cairnwell road[1] from Blairgowrie to Braemar: it has a summit level of just under 2200 feet, and on the south side—at the Devil's Elbow—the gradient is very steep. The col has been worn down on soft black schists nearly 1000 feet below the adjoining high ground.

The Cairnwell road has been used from time immemorial. By it Kenneth II.—his name, if not his memory, is perpetuated in Craig Choinnich, a hill overlooking Braemar—as well as Malcolm Caenmore and other Scottish kings, reached the royal hunting seat at Kindrochit (Braemar): by it the Earl of Mar descended on the Lowlands at the beginning of the '15: and it was remade to form part of one of Wade's routes to the north. For long it was an important drove road, along which much live stock from the more upland parts of Banffshire and Aberdeenshire passed to the great fairs in the midlands.

Two other noted drove roads led over the Fir Mounth and the Capel Mounth. The former crossed the plateau to the east of Mt. Keen (summit level about 2300 feet) and descended into Glen Esk at Tarfside: the latter made a rough ascent from Spital of Glen Muick and, after

[1] An old drove road branches off from the Cairnwell road a few miles south of Braemar and passes over the shoulder of Glas Maol into Glen Isla. Though undoubtedly a "right of way" it seems to have escaped the notice of the Scottish Right of Way Society: it leads through a district of great interest to the alpine botanist.

an easy but short stretch on the plateau, dropped abruptly into Glen Clova.

For nearly half a century the Fir Mounth has ceased to be used as a drove road. In prehistoric times, however, it seems to have been an important route. It can hardly be by chance that we find at its southern end the ancient twin fortresses on the Caterthuns, and at its northern end near Dinnet, where it reaches the Dee valley, numerous remains of extensive prehistoric fortification and settlement. In historic times there arose in similar association with it (1) the ancient town of Brechin (with *prehistoric?* round tower) and, near by, Edzell Castle; and (2) the castle, destroyed by Edward I., which was erected on an artificial island in Loch Kinord (Dinnet). Further, that magnificent feudal pile, Kildrummy Castle (with numerous *prehistoric* "Picts'" houses in its vicinity), stands upon the northward continuation of the same route.

Though Edward I., in his progresses through Scotland, is said—the statement is questioned—to have led an army over the Fir Mounth from south to north, neither the Cairnwell nor the Fir Mounth were roads likely to be traversed by a military force in the face of a determined enemy. The routes followed by invading armies lay farther to the east outside the plateau area.

Other passes by which the plateau may be crossed were suitable only for foot-passengers or pack-horses: the path through Glen Tilt is the most varied and picturesque, that from Glen Clova by the Tolmount to Glen Callater the grandest—and hardest.

With the advent of railways these roads and others more important farther to the east (*e.g.* the Cairn o' Mounth road) fell into disuse; and Aberdeen became more markedly than before the nodal point in all traffic between districts north and south of the plateau.

Since it was traversed by no important through road, upper Deeside long remained in a backward condition. Until comparatively recent times wheeled vehicles were almost unknown, and in many parts the *cuttack* or pack-saddle was a familiar object and continued in daily use till well into the nineteenth century.

As a further result of comparative isolation, Gaelic long remained the language of the Braes of Mar. In 1861 practically all the persons permanently resident in Braemar parish were Gaelic-speaking. Though now seldom heard, Gaelic is not yet extinct. The Lowland dialect that is rapidly displacing it has penetrated from the east.

The barrier presented by the plateau helps to explain many events in the history of Aberdeen. When north and south were of different ways of thinking, both parties desired possession of the city as the key to, and a base of supply on, the main north and south route, and as a position threatening the flank of an enemy attempting to use the practicable routes across the high ground immediately to the west. This seems to be the strategic idea underlying, for example, the Harlaw campaign.

A STUDY IN APPLIED GEOGRAPHY.[1]

FROM Dunfermline to Indore is a far cry, but the problem of a "Better City" is the same for both, and in the latest as in the first of Professor Geddes's series of town-planning reports we find the same methods of solution—to understand the present in the light of its past, and to think out a possible which will conserve what is of value and significance while reaching forwards in amelioration and development. The Indore Report touches on geographical interests at so many points, and is so often itself applied geography, that we need offer no apology for discussing it here.

It is a great day for the student of a city when he first sees it as a whole, but that is only a step towards a deeper knowledge when the city is seen as the outcome of an intricate historical development. In most cities the centre and germ of origin is soon discovered, as from cross roads or bridge, from fair or fort, but it took Professor Geddes a good many days of puzzling before he found the historic nucleus of Indore. He found at length in Juni Indore traces of the familiar "Three Streets Plan," a main Brahmin street with indications of the sacred Ghat and Temple, and a street on each side parallel to this, for humbler castes and secular uses. It was, to begin with, a little religious centre and convenient resting-place for yogis and pilgrims, protected by two river-loops, and surrounded by pasture. It was in isolation from the stream of secular affairs, and yet conveniently near the great high road between Bombay and Agra. There was a palace too in the Old Town, the mansions of the old Brahmin family of Rao, Zamindars of Indore since the Mohammedan age, and doubtless earlier. And as the little old Juni Indore, with its religious community, developed a ruling centre, and then became subordinated to it, there came about that transformation so well known in the history of cities—in Westminster itself for instance. We must not follow the history, however; we wish merely to indicate Professor Geddes's historico-geographical approach. It is enough to say that in the development of modern Indore and military Indore there is intelligible growth, with parallels in the West from Perth to Basle. The successive phases are expressions of the requirements of Religion, Government, Commerce, and War, as so much in the history of cities everywhere; and Professor Geddes's general summing up is that the many good qualities in the town, and its features generally, date from its origin and development—that is, are of its life and growth and essence—while its present dirt, congestion, disrepair, deterioration, and even too frequent dilapidation, are each and all very largely of our own modern time. Renewal and betterment must be preceded by a humble scientific study of the old quarters, leading to comprehension and appreciation, which will tend to check the repetition of what has happened to historic Paris and historic Cologne. But geographical sense is also required to prevent, for instance, the

[1] *Town-Planning towards City Development.* A Report to the Durbar of Indore. Indore, 1918. Part I., pp. xvii+203, 10 plans; Part II., pp. 205+xxvii+xiii.

repetition of such gross errors as orienting the buildings of the Military Lines facing south and north (right enough for cold temperate Northern Europe) instead of east and west, as Indian houses should be.

The Railway Age, with obvious advantages to its credit, has involved an increase of city congestion, even in Indore. Over-crowding in houses of low standard, "rat-homes," has brought disease and misery. Hence began a long period of sanitary reform, but this unfortunately characterised by mere slum-demolition instead of home-building. "The time is now ripe, in Indore as everywhere, for the primary sanitarian measure—far too long delayed by secondary ones of every kind—that of building new and better houses before we destroy the old ones." The whole chapter on Public Health in the Industrial Age is full of wisdom: "To look at many Indian cities one might almost think that plague was planned for." To keep plague from breaking out in the cotton-workers' mohallas, build better homes, have a dining shelter at the mills, and sweep the floor after meals, set up a pigeon-cote, and keep cats. "Health is the resultant, the habit of 'the good life,' that is of normal and full reaction with adequate environment." This means that the field must begin to gain upon the street, and the slum and semi-slum give place to the garden suburb; it means also more faith in science, which has so largely conquered guinea-worm and malaria, and other diseases; it means also much better dietary for the poor, and much simplified dietary for the rich; it means also a recall "from our recent idols, of coins and wheels, to the renewed worthship ('worship') of life." More plain-speaking is needed: "For these many diseases from which the starved are recorded as dying, though, of course, in detail so distinct, are really but famine-results, when all is said and done. It is not polite to say so; yet not honest not to say so; and between these alternatives science can have no choice." The deadliest disease is neurasthenia, this "world-wide depression of our time which explains the corresponding demand for medicines, stimulants, luxuries . . . and the prevalent mental inertia." To what this may be due Professor Geddes does not explain; it is "a slow depression, from starvation of body and soul together." "Shall we describe it as a starvation not merely of fruit or vegetables, but also of flowers?" The work of the Rockefeller Institute and analogous agencies have shown, with geographical circumstantiality, that tropical depression is largely due to hook-worm, but we should like to hear more about the wide-spread neurasthenia to which Professor Geddes refers. He says that "the regional surveys of certain French hygienists of geographical interests and outlook have disclosed not only whole villages, but even districts, depressed by neurasthenia." This is surely a case where figures should be tabled and precise causes analysed. Here Professor Geddes says either too much or too little.

Economically considered, a town is above all the market of its region, an enlargement of the ancient local fair, and the particular type of town and society varies with the staple products, whether wheat or rice, cotton or wool. In Indore the staple textile industry is cotton, but there is an opening for silk, and the possibilities of making the best

of cotton and more of silk are much wider than economic, for Professor Geddes has wise things to say about the civilisation-values and the drawbacks of—in order of merit—jute, cotton, linen, and silk. He shows a way of escape from the confusion of industrial England till lately, and of Indian industrial towns hitherto, by a development of the mill area as a garden suburb, and all this in matter-of-fact circumstantiality, in every detail of which his scientific idealism is expressed. For that is one of his outstanding characteristics—practical idealism in a truer than any technical sense.

Subsequent chapters discuss the increase and improvement of the water-supply; the defects of the drainage system and how they may be remedied; the possible organisation of the untouchable "sweepers," left by all castes to attend to contaminating contacts without adequate training or direction or pride in duty, instead of being elevated into Chinese gardeners; plague camps and their better planning; the housing of the cotton-workers, so that they may have the possibility of homes; the value of vital and cultural methods of sanitation as contrasted with mechanical and engineering methods imported from the West, usually to fail; the pros and cons of the principle "all to the soil," and those of "all to the sewer." "The difference between the engineering and the rural attitude and policy in this matter—that between 'all to the sewer' and 'all to the soil!'—is, in fact, parallel to that which was effected in the past generation for agriculture and physiology by the rise of the rural- and organically-minded Pasteur, against the long dominant authority of Baron Liebig, with his too strictly inorganic view and treatment of these subjects. And a generation of thinking peasants is coming: we biologists are but its scouts and pioneers."

The Report goes on to the making of simple and inexpensive houses, satisfying the prime requisite which is *room* (here is an interesting but rather tantalising brief reference to Mr. Sinha's new tile-wall method of building); the beautifying and ennobling of city gardens and parks; the establishment of a zoological garden with that of Edinburgh for model; the making of shade-garden and maze, rock-garden (with geology thrown in) and arboretum, sports park, "boys' corners," and "girls' corners" too. Very interesting to biologists and lovers of gardens alike is the chapter on "the garden of the phases of life," "the garden of evolution," the herb garden, the silk garden, the Japanese garden in an old quarry, the wild garden—not without its risks of spreading weeds—and the sacred garden. The garden chapter is one of the finest parts of the Report, as those who know Professor Geddes as gardener would expect.

Very striking is the section dealing with the purification and beautification of the Indore River and its tributaries. "The old religious view of rivers is no mere past mythology; it is a sublime anticipation of a many-sided renewal." The real geographical thinkers of the past—like Reclus, Metschnikoff, and Le Play—largely retained, and even revived, the old comprehension of the significance of rivers; and "upon this basis the renaissance of geography and of geographical education is now beginning." "The meteorological and geological conditions of rivers, and their conditioning of the vegetable, animal, and human life upon

their banks, is thus becoming more fully understood than of old, and again felt not less deeply. Again we see the rivers in their panoramic beauty and sublimity, and in their social significance. And the dependence of all forms of life, together with our own, upon these uniting waters, is becoming realised, as not only the widest conception of physiology and economics, but also as of psychological and emotional significance for each and all. Hence the modern geographical thinkers named above are, as it were, the modern incarnations of the old river-loving Brahmins and pilgrims of the earliest beginnings of Indore."

The rest of the first volume is devoted to a discussion of the improvement of Indore City Quarters, and includes a very interesting section on the re-planning of schools. Professor Geddes's dissent from customary school-planning in India is at once of the simplest and the most thoroughgoing kind. He pleads, with plenty of facts in evidence, for the Open-Air school, and this not so much on grounds of economy —though the saving over the city and state would be immense—but on grounds of public health and of educational results above all. He ingeniously shows that the very difficulties are really advantages, and that the circumventing of them is all on the way towards the education of life, towards "a Real School, preparing for real life, beyond all present abstractions of it on paper."

In reference to a proposal to establish at Indore a university for Central India, Professor Geddes has much to say in the second volume of his Report. The keynote of his discussion is that true universities have all historically arisen from a preliminary growth and demand of culture in their cities, and that they can be at best but watered and guarded by external wealth and power. As the primary regional interests in Indore are agricultural, the new university should be one in which the biological sciences and arts, in their Faculties of Agriculture, Hygiene, and Medicine, are central, "utilising the preliminary sciences, Mechanical, Physical, and Chemical, but henceforth as subordinate, no longer as supreme." To the question, how the Social studies, the Humanities, are to fare at the hands of "those who are primarily interested in Culture in its old and literal meaning, in terms of the creation, here and now, of better crops of better life, and only secondarily in the regard and commemoration of past ones," Professor Geddes gives an answer too fine to be condensed, but the general idea is that the more thorough the studies of organic life are, the more vital will be the comprehension and the more sincere the appreciation of the social process and its heritage. In every part of the curriculum, however, the studies must be made more vitally constructive, and this may be organically associated with a revival of the religious spirit of ancient days. Study and service must be linked anew; "and the life of youth will thus be turned and led on its reconstructive march by different music from that of the turning of wheels, the scratching of pens, the chinking of coins, and rustling of papers, of our passing order of life and education: for it needs and responds to love of neighbourhood and home, of country and city, yet of widening humanity as well." The Report goes on to detailed concrete advice in regard to the planning

of Central Library and Museum (called in Lahore the Wonder-House). There will be a type-museum, regional like that of Perth; a historical museum, like that of Saffron Walden in Essex to begin with, and later on like that of Skansen, the island park of Stockholm; and besides these an agricultural museum, a health museum, and more. All this culminates in an Outlook Tower, of which a singularly fascinating sketch is given. It begins with the simple geographical and cosmological outlook over the country, the historical and æsthetic outlooks over the town, it becomes an outlook of rural development and civic renewal, a watch-tower of the growth of civilisation, a light-house of its journeyings. "Why not increasingly a power-house, renewing and intensifying all these re-constructive and new constructive energies, alike of country and city, through its intensification, and clearing of their children's—and students' and citizens'—thought." And it is not in Indore alone that a University Tower may be all this, were men not of little faith and shackled imagination.

The remaining sections of the Report, which occupy far over a hundred pages, are concerned with estimates, procedure, administration, public health, losses from plague, tuberculosis, malaria, and other diseases, preventive measures, public health as public wealth, a proposed civic association of the "Friends of Indore," the most urgent tasks, and "where the money is to come from." A new period of economics, and of civic and state book-keeping accordingly, will be entered upon when it is realised by State Governments and Municipal authorities, that "the main wealth of their community lies not merely in past products, nor in paper or silver claims upon these, called 'money,' but in the Life-expectation and productive power of its citizens." "Life and death are neither matters of fate or mystery, but rest with ourselves, and this peculiarly in our community action." "Of all conceivable economic expenditures and productive investments, these on health yield the very highest of returns, and these often the most immediate also." "Though diseases are many, health is one; so the problem which arises, beyond all separate treatments, is to recover unity." And unity for a city is a complex integration; it means the appreciation and the co-operation of the various essential activities, none of which can be omitted, the lives of the citizens, their education, the industries, the arts, the government, the religion. This is graphically expressed in a characteristic inset in the north-west corner of Plan X.

In the two volumes before us we have obviously a very remarkable document; it has 85 chapters and 408 folio pages; it ranges over an enormous variety of subjects, from a philosophy of life to the species of water-weeds and mosquitoes found in the Indore River; it gives the reader, on almost every page, something to think over and work towards. Altogether, apart from Indore, it is a book for the times, abounding in wise interpretation and fertile suggestion, and not sparing in reproof. As it is not readily available, we have tried to give some idea of its scope and some indication of its teaching, but within our limits this could not be more than very inadequately done. The strongest impressions left in our mind are three: (*a*) The wise man is one who

sees the many aspects of things and problems; what impresses us in Professor Geddes's work is his resolute insistence on seeing *all* the aspects that the wit of man can conceive. This has become almost intuitive on his part, but it is the outcome of a persistent utilisation of an organon which he ought to publish to the world without further delay. (*b*) The idealisms of the Report are many and varied, but all are in the Here and Now; if they strike the stars they are geographical in basis. All the Utopias are Eutopian. Moreover, Professor Geddes's report is definitely put forward as "a business proposition," fraught with advantage and with speedy beginnings of return in City-values. That other values will be added thereto is plain enough. (*c*) Professor Geddes has no smooth tongue, and says some hard things—meant to reach further than Indore, and who shall say we do not need them!—but through the Report we feel the breeze of hope—the evolutionist's hope—inspired by a knowledge of the world-process whose main trend, in spite of many zigzags, has been integrative. J. ARTHUR THOMSON.

GEOGRAPHICAL NOTES.

GENERAL.

British Rainfall Organisation.—Dr. H. R. Mill has retired from his directorship of this organisation, which has been transferred to the control of the Meteorological Office. Dr. Mill, it will be remembered, contemplated retiral in 1914, owing to the serious condition of his eyesight as a result of overwork, but the outbreak of war caused him to postpone this step. Recently he has found that his health is unequal to the strain of adapting the work of organisation to pre-war conditions. Its transference to the Meteorological Office marks an epoch in the career of one of the most remarkable voluntary establishments in the country. Dr. Mill has been director for a period of nineteen years, and during this time the number of rainfall records received has increased by over fifty per cent.

Obituary: Sir William Macgregor, G.C.M.G.—We regret to record the death, which took place in the early part of the summer, of Sir William Macgregor, formerly acting High Commissioner for the Western Pacific, and successively Lieut.-Governor of British New Guinea, and Governor of Lagos, Newfoundland, and Queensland.

Sir William Macgregor, it will be remembered, lectured before the Society in March 1918, on "The Settlement of the Pacific," his paper being published here in May of that year. He was profoundly interested in the peoples of the Pacific, both from the human and the ethnological point of view, and it was his accounts of the inhabitants of New Guinea, during his tenure of office as Administrator in British New Guinea, which first drew the attention of ethnologists to the importance of this area as the region of contact between the Melanesian and Papuan cultures, and thus led to the sending out of a number of expeditions.

Sir William was born in Aberdeenshire and adopted the medical

profession, his first tropical appointment, that of Medical Officer at the Seychelles, having been accepted for health reasons. From his post of Governor in Queensland he only retired in 1914, and returned to spend his last days in Scotland. Both from the Universities of Edinburgh and of Aberdeen he received the honorary degree of LL.D., and that of D.Sc. from Cambridge, and he was a fellow of a number of learned societies.

Economic Geography.

New Zealand Flax in the British Isles.—According to the *Kew Bulletin*, No. 4, the result of prolonged experiment has been to show that there is a prospect that New Zealand flax (*Phormium tenax*) can be grown here on a commercial scale. Lord Vantry has conducted successful experiments with the plant in Co. Kerry, and obtained fibre which compares favourably with that imported from New Zealand. It is believed that the plant can be grown in the south-west of Ireland generally, in south-west Scotland, and possibly in southern England. It is in the first-named region especially, where few crops can be produced, that good results are hoped for. The fibre *Phormium*, it will be recollected, is used both in paper-making and in the manufacture of string and cord.

EDUCATIONAL.

Lectureship in Geography at Aberdeen University.—A new Lectureship in Geography has been established at Aberdeen University, and Mr. John M'Farlane, M.A., M.Com., Reader in Geography at the University of Manchester, has been appointed first lecturer. Mr. M'Farlane is a graduate of the Universities of Edinburgh and Cambridge, with honours in history and economics, and is the author of a text-book of Economic Geography. He has taken an active part in the work of Section E (Geography) at the British Association for a number of years, and is the Recorder of the Section.

His appointment means that, with the exception of St. Andrews, all the Universities of Scotland have now lecturers in Geography, though no professorship has yet been established, and no University has more than a single lecturer in any branch of geographical science.

Mr. A. Ogilvie succeeds Mr. M'Farlane at Manchester.

Geography at London University.—The University of London has established the degree of B.Com., and geography constitutes one of the compulsory subjects for this degree. The degree is to involve three years' work, and some indication of the change in the world outlook which has resulted from the war appears in the wide choice given in the selection of a modern language, which forms another compulsory subject. The list includes Polish, Czech, Rumanian, modern Greek, and the great Eastern languages.

Mountain Relief Models.—Dr. Du Riche Preller sends us the following:—"Many geographers and geologists may be interested to

learn that the execution of relief models as a scientific and artistic speciality has been and is cultivated with great success by Signor Amadeo Aureli, of the Royal Italian Geological Survey in Rome, who has, during the last twenty years, supplied such reliefs to close upon a hundred museums, universities, and other educational institutes in all parts of the world. It is to be regretted that in Great Britain, only very few of these reliefs are, as yet, to be seen, and these few only in the South Kensington Science Museum, London, in the Scottish National Museum and the College of Agriculture of Edinburgh, in the Dublin Museum, and in the Museums of Oxford and Cambridge. Among Signor Aureli's most prominent works are the great volcanic groups of Mount Etna and Mount Vesuvius, of the Gulf of Naples and the Phlegræan Fields, of the Bolsena region and the Albano Hills, N. and S. of Rome respectively, of Ischia and Stromboli, and of the islands of Santorin (Greece), Del Fuoco (Cape Verde) and Krakatoa (Dutch Indies), while his reliefs of crystalline and sedimentary groups comprise the whole magnificent *massif* of Mont Blanc, and the Monte Sagro or Carrara sector of the Apuan Alps. All these beautiful reliefs, built up in plaster and varying in scale from 1:20,000 to 1:100,000, give the complete and minute topographical details of the Italian ordnance and geological contour maps. The largest relief is that of the marble district immediately around Carrara on the exceptional scale of 1:5000, executed for the Museum of that town, from the classic geological survey map of D. Zaccagua, and shown at the Exhibitions of Paris and St. Louis. His labours have already gained for him various Exhibition prizes, medals, and other distinctions both in Europe and in America, and many others are no doubt in store for him, for his accurate, painstaking, and highly finished workmanship invests his reliefs with great and obvious educational value, and therefore makes them important adjuncts to the geographical and geological departments of institutes and museums.

"It is interesting to note that the accuracy of detail in the relief map of the volcanic group of Lake Bolsena, which relief has been in the S. Kensington Science Museum since 1896, served last year, through the medium of the present writer, to elucidate and decide a thorny geological point then in keen dispute at the head office of the Italian Survey in Rome."

NEW BOOKS.

EUROPE.

Pourquoi la Roumanie a fait la guerre. By J. Ursu. Paris: Payot, 1918. *Price* 4 *fr.* 50.

La Question Roumaine. By A. C. Popovici. Paris: Payot, 1919. *Price* 4 *fr.* 50.

These little books, written with the most patriotic spirit, contain an enormous amount of valuable information regarding Rumania, the latter volume being also illustrated with a fine map showing in colour the various nationalities of Austria-Hungary and the neighbouring States. M. Ursu has no hesitation in saying that, "resting on its Carpathian citadel, the new Rumania, in friendship with the

Checo-Slovaks, the new Serbia, augmented by its union with the Jugo-Slavs, and Italy, will become a force capable of preventing any return to the offensive by the Germans, the Magyars, or the Bulgarians, which were always the most destructive and turbulent elements." M. Popovici devotes himself specially to the sufferings of those Rumanians who inhabited Transylvania and Hungary, and were "subject for centuries to the odious yoke imposed upon them by the Magyars." The war has freed the Rumanians from that yoke, and has enabled them to enter upon a new era of liberty. Both authors append bibliographies which will be very useful to students of the Rumanian question.

ASIA.

With Pen and Rifle in Kishtwar. By Otto Rothfeld, F.R.G.S. Bombay: D. B. Taraporevala, Sons and Co., 1918.

This is a record of a three-weeks' shooting trip in July—neither the best nor the second best season for sport—in a district of Kashmir. Kishtwar, watered by the Chenab and its tributaries, although unfamiliar ground to others than shikaris, is actually in the southern half of Kashmir, south of the capital, Srinagar. The readableness of the book does not consist in any unveiling of an unknown land or any accumulation of a hunter's trophies. It is readable and interesting mainly for the jottings and monologues on men and things with which the book abounds. Robert Louis Stevenson with his notions and his word-sketches manages to enliven a very commonplace canoeing excursion in Belgium and north-east France, and Isaac Walton makes a book on Angling the vehicle for his delightful lucubrations; so with this hunter. Rightly, the title of the book is "With *Pen* and Rifle in Kishtwar," the *Pen* taking precedence, and one questions whether the book would have been so readable as it is, had the rain kept the hunter less to his tent or had the bag been larger than the one *tahr*, three *gural* or chamois, and two *panthers* registered. Rather than any hunter's adventures or successes, one carries away from the book such a sniff of the social atmosphere of Kashmir as we get when we are told that the Hindu Maharajah in his anti-kine-killing zeal prohibits Parsi shopkeepers from stocking soup-tablets or beef-tea even for the benefit of European visitors, or, again, such a bit of native tracker's lore as that the animal which got away, though wounded, may be located the day after by the circling overhead of the kites and vultures, the wounded animal's death-bed attendants. Indeed, one doubts whether the true blood of Nimrod can be found in one who, like the author of "Pen and Rifle," enjoys Bion and Moschus and Enripides in his tent on the rainy days. Occasionally, there is a jarring perception that the moralising is of the anticonvention, shocker, cynical type, and out of keeping with the feeling which loneliness among mountains inspires in the majority of men. There are some blemishes too here and there, like the girlishness, unworthy of print, that suicide was the only alternative to going out on a certain pouring day. The misprints in a number of the classical quotations are probably almost inevitable in a book printed in India, even in the city which calls itself *prima in Indis.*

Japan Day by Day, 1877, 1878-79, 1882-83. By Edward S. Morse. In two Volumes. Boston and New York: Houghton Mifflin Company, 1917.

Professor Morse visited Japan for the first time in 1877, before the glamour of the old feudal times had begun to disappear in the glare of modern days. He went to study Brachiopods; but, being gifted with the power of making rapid sketches, he unconsciously began to study the Japanese people, and chronicled his first impressions in a journal primarily intended for his own private use. In a

characteristic letter, quoted in the preface, Dr. W. S. Bigelow, for many years a resident in Japan, beseeches Mr. Morse to cease "frittering away valuable time on the lower forms of animal life, which anybody can attend to, instead of devoting it to the highest." "Remember," he continues, "that the Japanese organisms, which you and I knew familiarly forty years ago, are vanishing types, many of which have already disappeared completely from the face of the earth, and that men of our age are literally the last people who have seen these organisms alive. For the next generation the Japanese we knew will be as extinct as Belemnites." The author's first idea was to classify his memoranda under a series of headings scientifically arranged. But, very fortunately for the reader, he found this too heavy an undertaking, and simply presented his journal notes as a continuous record, embodying his impressions day by day. Naturally there is a good deal of repetition, but it comes in a new connection, and with a new interest. The illustrations, which number 777, are the simple sketches of the quick-eyed, quick-handed artist catching the passing phase, which the most faithful photograph cannot do, and which is even beyond the powers of the kinematograph. It is a positive delight to look upon these familiar street scenes and house decorations, upon temples, shrines and tombstones just as they appeared to the keen observer in whom familiarity had not as yet bred indifference. Many books have been written on Japan, and many of these have been beautifully and profusely illustrated; but none can take precedence of Mr. Morse's two volumes for absolute fidelity.

To the reader who knows Japan at first hand, every sketch calls up a trail of memories, of delights, or, perchance, of hardships—for even in the Land of the Rising Sun troubles do arise. The kaleidoscopic text, accompanying the correspondingly varied sketches, cannot fail to charm a reader who reads for enjoyment. In his preface the author felicitously compares what he calls his "light and disjointed material" to "the rambling crowds on the streets which the journal so often depicts." That is what gives the book its human touch, for human life never arranges itself in categories.

Considered as a picture of what Japanese life was in the late seventies and early eighties, and of what it still is in regions removed from great city centres, Mr. Morse's book cannot be praised too highly. He makes no claim to being a Japanese scholar, and it is just in this connection that occasionally his statements are apt to mislead. For example, he repeats without correction that hopeless piece of etymology which connects the name *torii* for the gateway of a shrine with the Japanese words which mean "bird-rest." The word is simply a corruption of the Sanskrit, and came into Japan with Buddhism along with the Aryan features of the Buddhist images. Again, he refers to Mr. Tomita as the authority for the statement that the name Fuji, of the highest mountain in Japan, is a word of Ainu origin. The discovery that Fuji and many other geographical names in Japan are of Ainu origin was made by the distinguished scholar, B. H. Chamberlain. In etymology, indeed, the Japanese are most untrustworthy guides. Some time in the history of literature place-names were represented by Chinese characters, which were chosen partly for phonetic reasons, partly for good luck (for the Japanese are strangely superstitious). Then the character having been assigned, the Japanese regards the character as the original thing, in terms of which the place-name must be explained. These questions, however, are touched on only incidentally, and with no claim to accuracy.

Although most of the experiences and impressions given by Mr. Morse are familiar to all who have sojourned for any length of time in Japan, there is one experience which we should think very few know anything of. Europeans and Americans have interested themselves in Japanese music or musical instruments;

but it is doubtful if any other than Mr. Morse had the ambition to learn to sing like a professional Japanese singer. He took lessons from a famous teacher of singing, and tried to reproduce the tones and intervals of his preceptor, but with little true success, if we may judge from his humorous description of the process of being taught. And yet the Japanese have very pleasing popular airs, which may be heard occasionally sung by groups of school children in the parks, and which have a certain resemblance to our melodies in a minor key. Mr. Morse laments his inability to recall Japanese tunes in the Japanese style ; probably his intimate friends do not.

The main purpose of the book is as the name expresses ; but every now and again the author touches incidentally on subjects of real scientific or anthropological interest. The discussion, however, is never sustained for any time, and breaks off suddenly just when the interest is deepening. This would be annoying if it were not that the new subject is generally just as interesting in its own way. A particularly fascinating chapter is that which begins with an account of the trained performing birds in Asakusa, a district of Tokyo dominated by a huge temple. These little birds are trained to shoot arrows, sound gongs, hang pictures on pegs, and apparently delight in going through their performances. And then all through the two volumes there are constant references to Japanese pottery, old and new, to shell mounds, and to various zoological and botanical questions, on all of which Mr. Morse is a recognised authority. For scientific discussion of these, however, the reader is referred to the author's other and more serious publications.

Sport and Science on the Sino-Mongolian Frontier. By A. de C. Sowerby. London : Andrew Melrose, Ltd., 1918. *Price* 12*s.* 6*d. net.*

The general and the more scientific reader of this book will find that the promise of the title is realised. The earlier chapters are descriptive itineraries of seven journeys, while special chapters on animals, flora, and geology group the more scientific facts. The seventeen plates of reproductions from photographs convey to the eye some impressions of the countries concerned. The author has sojourned in or about the Sino-Mongolian frontier since childhood, and his opportunities for more systematic exploration came between 1907 and 1912, when he collected for the British Museum and the Smithsonian Institution of Washington. The areas described lie about the wide loop of the Yellow River, crossed by the Great Wall, and include Shensi, with its Mongolian extension into the Ordos Desert, and the Province of Shansi, with extensions from Kalgan northwards beyond the Great Wall.

It may be a publisher's necessity in these times, but it is unfortunate that the special maps mentioned in the introduction are not included in the copy before us. This is a defect for the geographers, yet does not seriously affect the general reader who somewhat vaguely can follow the itineraries and enjoy the narrative. In books of travel there are two extremes, a sketchy, bird's-eye view which does not satisfy, and a painfully personal diary which satiates. Mr. Sowerby has hit a happy mean. Now and then he gives the diary of a day with its details of transport and menu, and of the domestic life of outlandish people. As a rule the narrative goes on fairly rapidly, and it is always interesting. The best scenes are the stalking and hunting of game, and all the keenness of the hunter is conveyed most graphically. The animal life was the attraction of the area, and the author combines sport in itself with the exploration of the fauna of lands imperfectly known. Compared with some countries, the animals are "small game." Wolf, leopard, and fox, wild pig, wild sheep, and deer, including the wapiti, nearly

complete the list of larger game. Yet important additions were made to British and American collections in the groups of smaller animals, especially the Rodents. The Mongolian frontier is not favourable to large mammals except such as can move rapidly from place to place. The highly cultivated valleys of China soon disappear on leaving the larger rivers. The loess and rocky slopes are bare except for occasional thickets of very dense impenetrable scrub, then follows the desert with its meagre vegetation. The Chinese husbandman is soon replaced by the nomad Mongol. Whatever woods exist are being steadily destroyed without replanting, and only such shrubs as renew themselves quickly and form thickets are able to resist. The trees and shrubs are familiar—hazel, birch, poplar, willow, scrub oak, spruce, larch, and pine. Fruit trees are abundant, and are carefully cultivated in the Chinese valleys, and even the valley slopes are brilliant in season with wild peach, apricot, and plum. Northwards, rolling grasslands and steep rocky ravines distinguish the landscape, and the Mongol flocks and herds constitute the country's wealth. Throughout the whole book the contest between the Chinese and Mongol is evident. The Mongol is described as—"this wretched people, by nature open-hearted, frank, and intensely religious, degraded by a religion sunk into something little better than demon worship and lust, and cheated by traders of a grasping neighbour on the south, and threatened by a slavery worse than the Israelites by an equally greedy neighbour (Russia) on the north." "A call comes ringing over the deserts of Central Asia to the humanitarian Powers of the West to help them in this their hour of need." "Will those Powers answer the call, and see that the Mongols are allowed that independence for which they are fighting?" "Will they send men to teach them the laws of hygiene and clean living, men to fight the ravages of disease, and men to give them a pure and uplifting religion? Or will they leave them to become a prey to intrigue, treachery, and their own degrading worship?"

GENERAL.

Shore Processes and Shoreline Development. By Douglas Wilson Johnson. New York: John Wiley and Sons. London: Chapman and Hall, 1919. *Price* 23*s. net.*

The author, who is Associate Professor of Physiography in Columbia University, has collected in this compact memoir an immense store of data from many lands and observers, relating to the origin and history of coastlines, and all his facts and conclusions are systematically marshalled in such a way as to make the monograph of the greatest use to the student of geography and physiography. But there are chapters on wave action and currents and tides that are full of useful engineering lore also. He states that the work was finished during the war, when he was on active service, but his laborious geographical researches have not been hindered by his patriotic labours, and the volume is all the more welcome as coming from an author who has shown himself willing if needs be to help a great cause, and lay down the pen to take up the rifle at his country's call to public service.

The first chapters deal with the nature and action of the sea waves, of which there are many kinds, and numerous striking photographs are given of the effect of waves on sea walls and harbours during great storms. Tidal action and currents are next investigated in detail, and their effect on shore-lines is discussed. The number and variety of currents described is remarkable—we have an account of wave currents, tidal currents, seiche currents, wind currents, planetary currents, pressure currents, convection currents, salinity currents, river currents, reaction currents, and hydraulic currents—a dozen distinct types in all.

The author discusses in connection with tidal currents the very important question of the movement and deposition of debris in bays and tidal estuaries. The question has often been raised as to whether the sediment in estuaries is derived from the river that enters from the land bringing down a load of detritus, or whether the material has been washed in from the sea, and is derived from the erosion of the coast outside rather than from the wearing down of the land in the river basin. In some estuaries or bays, such as the Wash, observation has shown that the rapid silting up of the foreshore, so as to permit of land reclamation, is due almost entirely to the action of the tides in bringing in far more sediment than is transported by the rivers.

In the case of the Forth the same principle appears to be in operation, although this river is not specifically referred to by the writer in this connection. He points out that the current produced by the flood-tide is, as a general rule, stronger than that due to the ebb. The sediment will therefore have a tendency to be washed in by a more powerful current than that which tends to wash it out again, and thus at slack water at high-tide some of it will accumulate, unless the volume of river water is powerful enough to compensate for the feebler ebb current. In the Forth it would now seem that all or nearly all the great accumulation of mud in the upper reaches of the estuary is due not to the river at all but to tidal action. The river flows out of various lochs in a perfectly clear condition at nearly all seasons, and therefore the great mud deposits in the upper reaches must be classified along with the deposits in the Wash and other inlets. It is important to appreciate this point, which has seldom been noted by observers, as it may have an important bearing on local harbours and reclamation works. The process of silting will be greatest in the higher reaches, and, consequently, the reclamation by "warping" will be most successful there. The estuary will, in course of time, fill up by the sea-borne mud independently of river action, and the mud on the foreshores will gradually creep down from Alloa and Grangemouth as the upper part becomes completely silted up. The natural silting up of the banks of the Forth above Grangemouth has being going on steadily for over a century without any artificial assistance, and the local residents' opinion that the mud is brought up by the flood-tide is entirely in accordance with the results of theory and observation in other places.

Another interesting point, discussed in Chapter IV., is the origin of fjords and their relation to the subsidence of the land. The author's view is that fjords do not necessarily imply submergence of the land, but can be explained by glacial over-deepening alone. "Glaciers in high latitudes reach the sea at the present time; and glaciers cannot cease to erode their channels until the ice is floated, which in turn cannot occur until the glacier has cut something like six-sevenths of its thickness below sea-level. Shaler was clearly right in stating that the over-deepened channel of such a glacier would be flooded by the sea as the ice melted, without any sinking of the land. It is important to remember, therefore, that there is no solid ground for the popular opinion that fjords are an indication of land subsidence" (p. 186). The point is doubtless a debatable one. The bed of the great Sogne Fjord in Norway is at its mouth 4000 feet below sea-level, and the whole pattern is that of a submerged valley. But there is direct evidence in the pre-glacial system of buried river channels of the Scottish firths, that the land stood several hundreds of feet higher before the Glacial period than it does now. It is therefore certain that in the parts of northern Europe where such rare evidence can be adduced, there has been an extensive submergence of the land, and a still later but smaller emergence since the Glacial period, and that the submergence was not local in character, but has been proved by boring and mining

operations wherever these have been carried on in and near the principal estuaries. It may be assumed that what has certainly taken place over a wide area in Scotland has in all probability happened at other places also, and there is room to question the author's conclusion that there is "no solid ground" for the opinion that fjords are an indication of subsidence. Whether or not the Scottish sea lochs and firths indicate submergence, there can be no doubt that there *has* been extensive submergence in this area, but it is always a more difficult matter to prove submergence than emergence of the land, and, doubtless, there is still something to be said on both sides of the question.

BOOKS RECEIVED.

The Village. Russian Impressions. By ERNEST POOLE. Crown 8vo. Pp. 234. London: Macmillan and Co., 1919. *Price 6s. net.*

The Bulgarians in the Past: Pages from the Bulgarian Cultural History. Medium 8vo. Pp. xi + 478. Lausanne: Librairie Centrale des Nationalités, 1919. *Price 8 fr.*

The Pacific: Its Past and Future, and the Policy of the Great Powers from the 18th Century. By GUY H. SCHOLEFIELD, B.Sc. With Maps. Medium 8vo. Pp. xii + 346. London: John Murray, 1918. *Price 15s. net.*

The Evolution of Modern Germany. By W. HARBUTT DAWSON. Medium 8vo. Pp. 444. London: T. Fisher Unwin, Ltd., 1919. *Price 21s. net.*

The Spirit of Russia: Studies in History, Literature, and Philosophy. By THOMAS GARRIGUE MASARYK. Translated from the German Original by Eden and Cedar Paul. 2 Vols. Medium 8vo. Pp. Vol. I. xxii + 480; Vol. II. xix + 585. George Allen and Unwin, Ltd., 1919. *Price 16s. net. each vol.*

Rambles in Rural England. By WM. J. CLAXTON. Illustrated. Crown 8vo. Pp. 188. 1915. *Price 1s. 6d. net.*

Journeys in Industrial England. By WM. J. CLAXTON. Illustrated. Crown 8vo. Pp. 192. 1918. *Price 2s. net.*

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TRAVEL MEMORIES.[1]

By Lieut.-Colonel A. C. Yate, F.R.G.S., F.R.Hist.Soc.

(With Illustrations.)

"Kum is a place of great sanctity in the eyes of the 'Muslimin,' and the resting-place of many of their saints, whose tombs are conspicuous by the domes or cone-shaped structures that surmount them. On the apex of these cones a sacred species of the stork (black and white) builds its nest. The principal mosque here, containing the tomb of Fatima, is adorned by a dome covered with a thin plating of gold (each brick is said to be overlaid with gold to the value of 1 toman = 8 shillings)—a strong temptation to thieves. The edifices of lesser sanctity are content with the external decoration of painted tiles, mostly much dilapidated.[2] Christians cannot gain admission to the interior of these buildings. The sanctity of this town renders it a favourite resort of Saiyads (descendants of Ali, the fourth Khalifa, and husband of Fatima, Muhammad's daughter, and father of Hasan and Husain) and Mullas, many of whom repair hither in their old age that their bones may be consigned to rest in its sacred soil. The town itself is half in a ruined state, and the only conspicuous trace of its 'madrasa' (college) are two dilapidated minars. Some of the private gardens are pretty. The covered bazaar is fully half a mile long and is well worth a visit. The shops appeared to me to be more tastefully arranged than is usual in Asiatic towns. In particular the stands of the sellers of sharbat looked most tempting to us, thirsty as we were after a long ride of six hours without so much as a mouthful of water—for a very good reason that there was

[1] Continued from p. 221

[2] Binning's *Persia* should be consulted for a good account of Kum, vol. ii. chap. 28.

no water *en route* fit to drink. We were heartily glad when we reached the residence of the telegraph clerk, and knowing that we had to ride throughout the next night in order to reach Teheran (ninety miles) we meant to make the most of our few hours' rest. However, circumstances arose that rendered repose out of the question.

"It took us some time to unpack and arrange our kit in the empty rooms allotted for our use, and then we had to strip off our travel-stained garments, bathe in the tank in the courtyard, and array ourselves in what we were pleased to consider our clean kit. Then after some delay followed a rough breakfast, and that was of course succeeded by a few whiffs of the kalián, and an honest pipe or two of golden-leaf. All this carried us on to fully an hour after mid-day, and though we disposed ourselves for sleep, sleep did not come, and before 3 P.M. the farrāsh of the telegraph brought us news that the chāpārchi would not give us horses. This danger of delay aroused us, and we sent off again several telegraph servants to appropriate and bring our three horses to the telegraph station. Again they returned empty-handed, so we took up our sticks and, accompanied by Mr. Jefferies, made tracks for the chāpār-khāna, and, by a judicious combination of eloquence and coercion, obtained our three horses and triumphantly carried them off, to the intense rage and mortification of a Persian gentleman who also required post-horses, and who injudiciously shouted at us, as we bore off our plunder, that he would reach Pul-i-Dallāk before us, engage all the horses, and leave us in the lurch there till the day of resurrection (ruz-i-kiyāmat). We profited by these words of warning, as I shall hereafter relate.

"In the meantime a few words about Kum and the trials of a telegraph clerk at that station. About two months before our arrival, *i.e.* towards the end of April 1881, unusually heavy rains fell in this neighbourhood. Close by the house that was then the telegraph station was a torrent bed that was usually more or less flooded during the rains. However, on this occasion (to give the account of the clerk, Mr. Jefferies), on the evening of the day on which this exceptionally heavy fall of rain took place, Mr. Jefferies happened to look out of his house and saw a great wave of water coming across the plain towards him. (His description reminds me of what I saw at Kandahar in April 1881, a scene that I have described in my Diary of the Afghan War, and which I shall never forget.) He had just time to remove his horse and saddlery from the building and hurry off to a bit of high ground hard by, when this impetuous wave of water burst over his house and in a very brief space of time reduced it to a ruin. Under its crumbled walls of mud lay buried his all—his clothes and kit of every sort, as well as all the telegraphic apparatus. He found a refuge for a few days in a masjid, and lived as best he could. The Governor came to see and offered to assist him in any way with kit, clothes, etc., and finally placed at his disposal the house in which we found him located. He obtained in a few days new telegraph instruments from Teheran, and soon got the telegraph into working order. Still, when we visited him, he was living in a very hand-to-mouth style, having raised a few articles of crockery and

cutlery, etc., in the bazaar, and fitted himself with clothes made up by the local tailors. Under these adverse circumstances we can but feel all the more gratitude for the man who entertained us so hospitably and assisted us so materially as he did in procuring our horses.

"Our ride from Kum to Teheran was, as we knew beforehand, the stiffest we would have in our Persian travels. We were to ride to Pul-i-Dallak (the Barber's Bridge, being built by some barber who had flourished at his trade), and there changing horses go on to Hauz-i-Sultan (total ten farsakhs), where we expected to arrive about 10 P.M. There we intended to dine and rest a little, and at midnight, when the moon rose, start for Teheran, an additional fourteen farsakhs. From Teheran to Gulahek, the summer residence of the British Legation, is from two to three farsakhs. Thus the entire distance to be traversed was about twenty-seven farsakhs or about ninety-five miles. Thus we travelled the 160 or 170 miles from Kashān to Teheran in forty hours, and in those forty hours we had not more than four or five hours' sleep. Having previously ascertained that the gates of Teheran were closed at sunset, and on no account opened until sunrise, we knew that we must time our entrance into that city accordingly.

"Of the Governor of Kum, before-mentioned, the following story was told us. His father was Governor many years ago of one of the southern provinces of Persia. The then Shah (whether Nāsir-ud-din or his predecessor Muhammad is uncertain) paid him a visit, and was not only surprised but alarmed at the fine array of troops and retainers which this Governor turned out to do him honour. A Governor who held such a powerful armed force at his disposal might, he felt, be dangerous to the security of his sovereign rule. He accordingly made up his mind to rid himself without delay of one who might prove a rebellious subject and a rival, and he effected his purpose thus. At an hour when the Governor was known to be in the habit of retiring to his private apartments and to be isolated from his guards, the Shah sent off several of his servants to visit him. One of these servants being introduced to the presence of the Governor, presented him with a bowl of sharbat, saying that the Shah had done him the honour of sending it to him. Such an 'honour,' as is well known, was in its consequences tantamount to the cup of hemlock which Greek refinement regarded as a gentlemanly (in the case of Socrates) or ladylike (in the case of Chrysis in the *Aphrodite* of Pierre Louys) method of quitting this world. The Governor hesitated to accept the proffered gift. Thereupon the servant slipped to the door, raised the 'pardah,' and showed the Shah's executioner and his satellites waiting outside. The Governor thereupon, seeing no help nigh, resigned himself to his fate, said his prayers, drank the bowl of sharbat, and a few minutes later passed away from this world. That the Shah subsequently conferred on this Governor's son the hand of his eldest daughter in wedlock may be viewed as an atonement and an honour, but his appointment to the Governorship of Kum—an appointment that from its proximity to the seat of government would keep him under strict surveillance—savours of precaution.

"17*th June*.—At 4.15 P.M. we started from the telegraph station at

Kum, and, riding through the bazaar and a few tortuous lanes, found ourselves amidst a barren undulating country. Remembering the threat of the Persian gentleman at the chāpārkhāna, we resolved not to be outdone if possible. We were not even sure that the Persian and his suite had not started before us. However, hoping that we had the start of them, we proceeded to test our horses, and finding that my pony was the best of the three, it was agreed that I should push on as fast as I could to Pul-i-Dallāk and secure horses there. My pony was a little grey of about thirteen hands, but strong and a steady goer. Nothing would induce it to go quicker than a slow steady canter—but at that pace it was game to go seemingly till it could go no longer. So away I went at this even pace over hill and dale, rock and sand, kohtal and nullah, leaving my brother and the shāgird-chāpār to follow as fast as they could. Some nine or ten miles from Kum I emerged from the undulating country into a broad plain, and as I descended saw before me at a distance of six or seven miles the chāpārkhāna of Pul-i-Dallāk. I had not proceeded more than half a mile across the plain (having just passed a kārwānsarai on my right), when looking round I saw a cloud of dust issuing from the point where the road debouches from the hills into the plain. From that cloud of dust emerged four or five horsemen. I felt sure that these were Yūsuf Khan and his suite. So I urged on the grey pony in its canter, thinking of the saying, 'a stern chase is a long chase.' Soon I noticed that one horseman was pressing on ahead of the others and was taking a straight line across country to Pul-i-Dallāk. I felt bound to follow the road, not knowing the nature of the surrounding country. This horseman was evidently far better mounted than I was, and in the first two or three miles gained considerably—indeed he came up nearly level with me and about three-quarters of a mile on my right; then he altered his course (perhaps came to an impassable torrent-channel), and made for the road, while I forged steadily ahead. Subsequently he never gained on me—indeed he lost ground, if anything—and I reached the chāpārkhāna fully five minutes before him (at 6 P.M.), and, finding four horses there, claimed three immediately, and, taking them aside into a corner, stood as sentry over them. When Yūsuf Khan's servant arrived, some conversation not understood by me passed between him and the chāpārchi, and then Yūsuf Khan and his other followers arrived. However, they made no attempt to touch the horses appropriated by me, and a few minutes later my brother arrived. Finding himself forestalled, the urbanity and courtesy of Yūsuf Khan were a model. He said that he considered us, as strangers in the country, as his guests, and would willingly make any sacrifice to assist us. His servants brewed some tea for him, and he kindly offered us a cup, but that we declined.

"A river with water as salt as salt can be flows close by the chāpārkhāna and is crossed by the bridge (Pul-i-Dallāk) which gives its name to the place. Drinkable water is obtained from an āb-ambār. The whole of the country between Kum and Teheran is barren and divided into plains, undulating tracts and hill-ranges of no great elevation. Several rivers are crossed by bridges, but the water of all is either salt or

brackish. Leaving Pul-i-Dallāk at 6.30 we reached Hauz-i-Sultān[1] at 9.15 P.M. My brother and I tossed up who should stay behind and bring on the baggage-horse, which was a poor goer and a vicious brute besides. I won the toss, but volunteered to goad on the baggager. So my brother reached Hauz-i-Sultān about 9 P.M. At the karwansarai, about half-way, our festive Armenian caved in, but for a karān a "sarbāz" (soldier) offered to ride the baggager, and as I lashed him on from behind with a whip (he in his turn lashing out behind vigorously at every stroke I administered), we got over the ground speedily, but such travelling is very wearisome to soul and body.

"At Hauz-i-Sultān we heated a tin of soup and dined satisfactorily on that and biscuits and Persian bread. The meat was followed by a cup or two of very strong tea,[2] to ensure exemption from the drowsiness which is the great curse of night marching. We also took a bottle of this potent concoction with us in case the effects of the first dose passed off before

View of the Elburz Mountains taken from Ishratabad (one of the Shah's country resorts) in the vicinity of Teheran. Taken in 1897.

daybreak. We smoked our pipes and reposed lazily till midnight when the moon peeped above the eastern horizon; then we sounded 'boot and saddle,' just as Mr. Yusuf Khan arrived. We exchanged a few *politesses banales* with him and then started, mounted on the pick of the horses and leaving him the choice of his own or our tired animals. We reached Kināragird at 3.15 (seven farsakhs = twenty-four miles) and left at 3.50, Yusuf Khan again coming in just as we started; so that he evidently made the best of the beasts at his disposal, for we by no means loitered on the road. The fact is, a good horse will do a second stage much better than a bad one will do one, and as Yusuf Khan at Hauz i Sultān had the choice from a number of really good horses, if only not overtasked, he got on almost as rapidly as we did, especially as he and his followers had no heavy baggage, as we had on the shagird's horse. We did not see Yusuf Khan again, although the ponies we got at Kināragird were such miserable creatures that we could barely induce them to cover five or six miles within an hour. Shortly after daylight we passed over a hill-range, and as we descended its northern slope got

[1] Six farsakhs. [2] Without milk and sugar.

a fine view of the Teheran valley and the Elburz Mountains. Of the country between Hauz-i-Sultān and Kināragird we could form but little idea in the darkness of night, but to the best of my recollection it was barren and hilly, and similar in appearance to most of the tract lying between Kāshān and Teheran. We passed some streams and rivers, but did not test the quality of the water. We were much delayed and annoyed by the endless strings of mules and camels that we met and passed in the dark. We had no choice but to vacate the road in their favour, and consequently in attempting to make way ahead over rough ground we and our ponies had several spills together. Still there was no harm done.

"It has often struck me as both strange and singularly fortunate that, considering the wretchedness of our mounts and the speed at which we urged them to travel over any ground, smooth or rough, we never had a single bad spill.

"To revert to the view of the Teheran valley from the hill-range between it and Kināragird, the valley itself is of great extent, stretching northward for twenty-five or thirty miles to the Elburz Mountains and east and west as far as the eye can see. It also appeared well irrigated and cultivated. The Elburz range averages some 12,000 feet in height and is covered with snow, while the peak of Demawand,[1] the height of which is about 20,000 feet, presents its upper half to the eye as one solid cone of snow. A few Europeans have reached the top, among others Major the Hon. George Napier and, since we left Teheran, Captain Wells, R.E., and Mr. Stack.

"Descending into the plain of Teheran we traversed a tolerably fertile country and passed several villages. Teheran itself is not distinguishable until one approaches quite close to it, as it appears to lie in a hollow. The gilded dome of the sacred mosque of Shah Abd-ul-azīm, with its zone of gardens and orchards, lying six or seven miles south-east of Teheran, at once attracts the eye. When we were about two farsakhs from Teheran we met some half-dozen post-horses returning to Kināragird, so we promptly halted, transferred our saddles and kit to three of the most promising beasts in the return-batch, and, mounting them, gaily galloped into Teheran, where we arrived a little before 8 A.M. We entered the city by a gateway ornamented with painted tiles, frescoes, and small pinnacles, and skirting its west end, and passing the Shah's palace and some barracks close by, also several fine gardens, we left the city by the north gate, which is in appearance the exact counterpart of the gate by which we entered, and seemingly of all the other gates.[2] Our tour thence to Gulahek leads up a well-metalled road lined on each side by delicious shady trees and bordered by rills of clear rippling water from which we drank with great avidity, after the filth called water that we had to swallow between Kāshān and Teheran. On a slight eminence to the right of the road stands one of the Shah's palaces,

[1] See *Rawlinson's Ancient Monarchies*, vol. iii. p. 135.

[2] The twelve gates of the city of Teheran are reproduced in *The Sphere* of September 6, 1919.

a castellated edifice, styled the Kasr-i-Kājār. The same road leads to another palace called Sultānābād. As we entered Teheran we met a carriage drawn by six horses, and preceded and followed by outriders and mules laden with ice and provisions. The carriage contained several ladies, whom we afterwards found to be some of the Shah's wives proceeding for prayers and a picnic at the shrine of Shah Abd-ul-azim. It is said that the Shah's wives do not veil themselves in public, all Persians being supposed to turn their backs when they meet them in the streets.

"Leaving the avenue leading to Sultānābād we turned to the left and, following an indifferent road for two or three miles, at last to our unfeigned delight reached about 10 A.M. Gulahek, where we were most kindly welcomed by Colonel and Mrs. Murdoch Smith.[1] The distance

In 1914 the only six miles of railway in Persia, connecting Teheran with the Shrine of Shah Abd-ul-azīm, where Nasir-ud-din Shah was assassinated on 1st May 1896. The Nushki-Duzdab line, the last 30 or 40 miles of which are in Persian territory, was constructed in 1916-18.

from Isfahan to Teheran is reputed to be about 280 miles, and we travelled it in four days and six hours. We heard that this distance had been traversed by telegraph employees, travelling alone and without baggage, in the undermentioned times: by a telegraph ghulām in thirty-six hours; by Dr. Wills in forty-two hours; by Dr. Baker in forty-six hours; by Mr. Mackenzie in forty-six hours."[2]

We gather from the information which has filtered through to the British Isles during and since the war, that the days of express journeys by post-horse in Persia are nearing their end. The era of railways, motor-transport, and air-craft has begun. We need not embark upon

[1] *The Life of Major-General Sir Robert Murdoch Smith, K.C.M.G., R.E.*, by his son-in-law, W. K. Dickson (Blackwood, 1901), is full of interest. No one who knew Sir Robert can do otherwise than warmly cherish his memory.

[2] Extract from Diary of 1881.

details here. This epoch-making war has placed Persia, as also many other countries and peoples, in a new setting. The presumptuous demands of the first Persian delegates to the Peace Conference at Paris have been tempered by experience, and the future relations between Britain and Persia have been regulated on terms which His British Majesty's Government hopes will restore to Persia in time its pristine prosperity and tend to safeguard British interests in the Middle East. The Persian Foreign Minister, who has recently spent some weeks in this country, has a very onerous task awaiting him. Persia is at this moment simply surrounded, except along its southern borders marching with Mesopotamia, by nations and races in an active state of unrest. Kurdistan, Armenia, Georgia, the Caucasus, Russian Turkistan, and Afghanistan are all, it may fairly be said, in the melting-pot; and against all, or any one of them, it behoves Persia to be on her guard, notably against the Afghanistan of the Amir Amanullah Khan. The Armistice of November 11, 1918, has proved a prelude not so much to peace as to treachery and disloyalty. Egypt and Afghanistan are signal cases. We may welcome the unexpected intelligence that British troops are back again at Mashhad. From that point Herat and Merv can alike be watched. The British force at Mashhad, to be effective, should be strong. Our labour extremists agitate for the withdrawal of British troops from every field of action. All Britain would gladly see every soldier at home and at rest, but the state of Eastern Europe and Western Asia forbids it. His Majesty the Shah has just been with us, and of him a gifted Afghan student of Edinburgh University writes:—"I was in attendance on the Shah throughout his stay in Edinburgh. He showed a keen desire to learn everything worth learning in this country. . It is a very bright sign."

POLAND AND THE POLES.

Mr. Bruce Boswell has written a most interesting book on Poland and the Poles,[1] a subject at present of the greatest international importance. A Research Fellow in Polish in the University of Liverpool, Mr. Bruce Boswell resided in Poland for five years, and thus gained personal knowledge of the country and its people. His description of the latter is refreshingly vivid and encouraging after the long and mournful statistics with which Polish history is so often encumbered.

We are reminded that "the Poles, like all the Slavs, are highly imaginative." They have also "an intense appreciation of beauty," a faculty which "has found its expression in poetry, in music, and is seen in the eyes of every Pole." All the Poles amuse themselves with music and the national dances. Sometimes every member of a family plays either on the organ, piano, or violin. "Hospitality is universal and unlimited. Guests will be accommodated in all the rooms and will sleep on sofas, on mattresses, on the floor, or even in barns." Again, "the Poles are

[1] Methuen and Co., London, 1919. Price 12s. 6d. net.

enormous eaters, and have a splendid *cuisine* of their own. They are great talkers, and converse with tremendous zest and vivacity."

Adjoining the Polish country house "lies the *cottage* as the mainstay of Polish life. The Polish peasant is almost always a landed proprietor. The Polish peasants are not only free and possessed of their own land but they are taking a great share in the national life and are giving to Poland many of its leaders in all departments of life." The peasant's "main interests are the land, religion, and patriotism. He is first and foremost a tiller of the soil, who would be lost without his land." "He is devotedly attached to the Roman Catholic Church, and the Polish priest, though most often of another class, is always respected and followed by the peasants. The religious spirit of the peasant is revealed in his conversation, his resignation to the will of God, and his respect for the village priest. His ordinary greeting is 'May Jesus Christ be praised!' to which the answer is, 'for ever and ever.' The whole countryside is covered with shrines, from a large monastery like that of Czenstochowa, to which he makes pilgrimages, to the small chapels at the cross-roads or wells, and the universal wayside crosses, which generally hold a figure of the suffering Christ, with some kind of decorative scheme. One of the chief characteristics of the village is the crowd in and outside the church on Sundays and Feast Days. And Polish religion is no mere formalism, as it often is in Russia; it is a deep reverence and devotion to the Roman Catholic Church, which permeates all the life of the peasant. The village generally centres round the church, which is often a very fine edifice, and, as in Ireland, a contrast to the mean buildings near it."

"The costume of the Polish peasant is very picturesque and of immense variety. It is different in each locality." "A complete revolution in peasant life has been accomplished in the last fifty years, chiefly owing to the devotion and self-sacrifice of some of the gentry and priests, but also owing to the adaptability of the peasants themselves. The movement was mainly educational, rather than political. It involved, firstly, a great development of education among the peasants; secondly, a general raising of the material life of the peasant by improvements in agriculture and by a co-operative system of credit; and thirdly, the organisation of the peasants for national and political purposes. Polish peasants are taking a large place in art and literature and have appeared in the Duma and the Reichstag. They formed a majority of the Polish deputies in the Galician Parliament, and to-day we see a new Polish Assembly consisting largely of peasants, well educated and completely conscious of their nationality, tenacious of their past traditions, and well versed in the problems of their country to-day."

"The Jew is a common feature of the Polish village, and lives quite happily with the peasant, as he has done for centuries. He is always extremely busy with money-making and seems curiously alien among his peasant neighbours. The popular attitude towards him is more one of jocular contempt than of national dislike." Elsewhere, however, the author points out that "in recent years a bitter hatred has grown up

between the Jews and Poles for several reasons." Occasionally Jews driven from Russia by pogroms and harsh laws, migrated into Poland, and not only displayed great arrogance and antagonism to everything Polish but also infected the older Jewish residents with their antipathies. "The Jews, with their cosmopolitan outlook and their close touch with Germany, became also the chief supporters of Social Democracy in Poland and formed a revolutionary association of their own called the 'Bund.' But the deepest cause of Jewish hatred for the Poles lies in the recent growth of a Polish middle class and the attempt to eliminate the Jewish usurer from the village. This policy was peacefully carried out in Poznania (Posen), which has now ceased to be a Jewish area. A campaign of calumny has been directed against the Poles wherever there are Jews, and their world-wide dispersion makes these attacks particularly efficacious. They attack the Polish gentry principally. But it is not a legitimate attack. The gentry were always tolerant of the Jews. It is the rise of the Polish peasant they resent, and if any anti-Semitic outbreaks occur in Poland they will be among the newly-educated peasants. The Jewish attacks have chiefly been directed against the National Democrat party and have been incidentally of enormous service to German propaganda." The Jewish question is one of the difficult problems of Poland. Half the Jews in the world are now living on Polish lands. They form over 14 per cent. of the population in the former Russian Kingdom of Poland, and over a third (300,000) of the inhabitants of Warsaw, the capital city of Poland, are Jews. They are easily recognisable in the streets of Warsaw by their distinct costume, which consists of a low round black cap and a long black cloak reaching almost to the ground. They are almost always bearded. Their ordinary language is Yiddish, a corruption of a Low German dialect with an admixture of Polish words. The more learned Jews speak Hebrew, and all understand Polish and sometimes Russian. A great deal of the retail trade of Warsaw is in their hands. They are butchers, bakers, and small shopkeepers. All the second-hand bookshops are in Jewish hands. "The commerce and transport agencies are also largely in the hands of the wealthier Jews, who act to a great extent as representatives of German firms. The English traveller will not be able to do much business without the Jewish middleman, and he will find that preferential treatment is given to German firms."

Mr. Bruce Boswell gives an attractive description of the city of Warsaw, which is "situated on a long low ridge on the west bank of the Vistula, which is here a noble river some 500 to 600 yards in width." Externally Warsaw is a magnificent city. It also possesses extraordinary geographical and strategical advantages. It is to-day one of the centres of a great industrial region, and manufactures machinery and other goods for a wide area, including most of the former Russian Empire. It is also the chief market for a great agricultural district and the centre of a wide forest area from which timber passes down the Vistula to the Baltic. Railways spread from the city in every direction. Warsaw possesses numerous hotels and places of amusement. It is a "nest of dramatic and musical talent." The Polish gentry have ceased to be a

caste, and are to-day scattered throughout the community as artists, business men, shopkeepers, and artisans. "But it is in the life of the middle classes that all the important currents of Warsaw flow strongest, from business, professional work, politics and journalism, to art and music."

Besides having chapters on Polish literature, education, science, art, music, and the war, Mr. Bruce Boswell's work is accompanied by physical and ethnographical maps of Poland and a map of the Polish State before the Partitions. It has also numerous illustrations from photographs.—R. R.

THE PACIFIC AND ITS PROBLEMS: AUSTRALIAN AND NEW ZEALAND STUDIES.[1]

Mr. Brunsdon Fletcher is, we believe, an Australian—a real son of the great ocean, Sir William Macgregor calls him in his preface—and, as such, he may fairly claim a special right to give to the world the result of his studies on the problems which present themselves for solution in the vast area of the Pacific. His book (i.) covers a great deal of ground, in a political sense, from the first announcement by President Monroe of his doctrine in 1823, and the attitude of Great Britain and Russia to the United States over the delimitation of frontiers in Alaska, down to the time of the advent of Japan as a great power in the Pacific, and the parts played in the islands by Great Britain, America, France, and Germany. It is difficult to give due weight to questions so varied and so complex within the compass of a volume of some 200 pages, and one admires the courage shown by Mr. Fletcher in essaying such a task, but his book is evidently the fruit of much careful study. A preface is contributed by that great South Sea administrator, the late Sir William Macgregor, in which he points out how the position of the United States in the Pacific has grown in importance with the completion of the Panama Canal, and also how very desirable it is that questions outstanding between France and this country regarding the New Hebrides group should have been settled at the Peace Conference. He says (page xxv) that "the kernel of the Problem of the Pacific seems to be: Shall any of the possessions of Germany in the Pacific be restored to her?" "Australia and New Zealand have clearly and distinctly . . . answered that question in the negative: their distrust of Germany as a neighbour is well founded . . . and the best, the only way to make the Pacific safe and peaceful will be to keep political Germany out of it."

Mr. Fletcher gives an interesting sketch of the course and development of Germany's ambitions in the Pacific. Trading centres were

[1] (i.) *The Problem of the Pacific*, by C. Brunsdon Fletcher. London: William Heinemann. Price 10s. 6d. net.

(ii.) *The Pacific: Its Past and Future*, by Guy H. Scholefield. London: John Murray. Price 15s. net.

multiplied, and peaceful penetration by chartered companies was planned to pave the way for an armed attack on the British Possessions, when the time seemed to be ripe for such. Germany has had a large share in the trade of the islands, and the Goddefroys of Hamburg, who were the chief pioneers in that trade, were known to be in the counsels of the Emperor. It is also well known that Dr. Solf (afterwards Secretary of State for the Colonies) was the first German Governor of Samoa. A man of pleasing personality, he showed himself helpful of British interests in Samoa and friendly to the planters, so that he left golden opinions behind him. But Mr. Fletcher points out that, about two years previous to the outbreak of the great war, a new type of German official appeared in Samoa who let it be known that the days of friendly understandings had passed, and with them the nomination of British residents to the Council, etc. It is hinted that the completion of the Panama Canal had brought with it a keener appreciation of the strategic value of Samoa as a base for German sea power in the Pacific, and that this may have accounted for the change of front. The disappearance of Germany from the Pacific, and the advent of New Zealand as the man in possession, opens a new chapter in the history of Samoa; but we may remember with gratitude that the preservation of Stevenson's grave from utter neglect was due to the action of a former German Governor, Dr. Schultz.

Japan is bound to figure largely in all questions which concern the future of the Pacific; she is the dominating power in the north-west, and, during the war, she has added the Marshall and Caroline Islands to her possessions. With her powerful Navy, her strategic position is one of immense power, rivalling that of Great Britain and the United States. Hitherto the British Navy has taken the leading part in policing the islands, keeping the peace, protecting the white man against the natives, and *vice versa*.

In the settlement after the war it is generally admitted that Australia must have the control of what was German New Guinea, while Samoa falls to New Zealand. Mr. Fletcher, however, makes no secret of his belief that "our kinsfolk in the Pacific have no apparent wish to be drawn into closer relations with the Australian Commonwealth," and he points to the difficulties which have arisen over the policy of Labour governments towards Northern Queensland. He foresees that similar difficulties are likely to arise in dealing with New Guinea, these being partly the results of a narrow fiscal policy. In illustration of this he says (p. 179) that a series of strikes in Australia have dislocated the island traffic and held up supplies, so that traders, missionaries, business men, and the natives themselves have begun to think of the Commonwealth in terms of Australian instability and restlessness. "Instead of finding Australia a friend in need, or a present help in the ordinary emergencies of life upon the greatest ocean in the world, they have been moved to denounce Australia as a nuisance, if not as an enemy." This, one must admit, is not encouraging, looking to the near future of New Guinea and other parts of the Pacific which now are, or are likely to come, under Australian control, but it is well to

remember that from the Australian Labour Party has emerged a leader like Mr. Hughes, and Mr. Fletcher is able to close his chapter on Australian Development with a note of hope. He shows that "the proximity of Asia, and the influence of the ocean washing Australian shores, have been as potent as the sun itself in affecting a developing nationhood. . . . When the time comes Australia will prove herself quite capable of large responsibilities and serious sacrifices, but she will require the patience given to strong-limbed, vigorous youngsters intent upon reading the world in their own way." "Australia and New Zealand are thinking very earnestly about the future; and as they study the map of the Pacific and wonder what a peace worth having may bring forth, they are profoundly impressed with their place at the Antipodes, facing a probable influx of population beside which their past experiences will count for little or nothing."

A suggestive idea is that in Canada, stretching from the Atlantic to the Pacific, we have a great "bridge of Empire" in which the dream of Columbus of a westward route to the Indies and Cathay is perfected. We would also mention briefly Mr. Fletcher's proposal for an interchange of students between Indian and Australian Universities. It is, perhaps, not generally realised at home that there are 60,000 Indians in Fiji, and that their numbers are increasing.

The Pacific occupies about one-half of the globe, and Mr. Fletcher emphasises the point that no proper conception can be formed of its magnitude without reference to a map on a globular projection in which it is presented as an entire hemisphere, a single unit, and not in the mutilated form in which we find it on maps of the eastern and western hemispheres, or on Mercator's projection. Such a map, showing the true relation of the islands to the continents, and their relation to the ocean itself, finds a place in many Australian schools, and it will also be found in both of the volumes which form the subject of this review.

New Zealand has secured a worthy representative in the literature of the Pacific in the person of Mr. Guy Scholefield, whose book (ii.) takes the shape of a history of the islands, in which the story of each particular island, or group, is treated separately, from the earliest times of European intercourse up to the present day. The labour traffic ("Blackbirding"), which proved such a thorny and difficult question, and also the questions which arose with France over her Recidiviste policy in New Caledonia, both find an important place; and, in an appendix, there is a reprint of treaties and conventions, as well as a useful chronological table of events, going back to the year 1511.

Mr. Scholefield draws special attention to the fact that nearly the whole of the islands lie to the westward of the 140th meridian of west longitude, most of them being to the southward of the equator, and that the eastern half of the South Pacific, to a distance of about 5000 miles from the American coast, is practically devoid of islands. The importance of this geographical factor is too great to be overlooked: it means that the great majority of the islands are within 2000 miles of Australia and New Zealand, and it lends colour to the Monroe doctrine for Australasia which was first affirmed by Sir George Grey,

and which may yet become a working practical policy, as Australia and the neighbouring Dominion grow in power and population.

The reluctance of the Home Government to embark on schemes of territorial expansion in the Pacific has been a fertile source of grievance in the colonies, and this feeling took an acute form in the latter part of the last century. A large portion of Mr. Scholefield's book is taken up with the disputes which arose out of this attitude, especially while Lord Derby and Lord Granville had their respective turns at the helm in the Colonial Office. In his "Review of Policy" Mr. Scholefield reiterates the complaints against the British Government for their *laissez faire* spirit and disregard of the wishes of the colonies, and he quotes Lord Derby's "immortal statement that Queen Victoria had already black subjects enough." As an offset to Lord Derby's view he repeats the reply given by Lord John Russell at an earlier date to the French diplomat who asked how much of Australia England made claim to—"*The whole of it!*"

The histories of Tahiti and also of Hawaii are of unedifying squabbles between European powers, ending in petitions to Great Britain for protection or annexation. These petitions were steadily refused, and the Tahiti group passed to France in May 1888; while Hawaii was annexed by the United States in the same year. Mr. Scholefield points out that Hawaii was placed under the protection of Great Britain in 1794 by a council of the native chiefs, and that the flag was hoisted in February of that year, but that the cession was never ratified. The above, and many similar incidents in the history of the Pacific, should help in refuting the charge of grab which is so frequently levelled at Great Britain by her enemies and detractors.

That the extension of German sovereignty in New Guinea and Samoa was carried through and agreed to by our Government in the teeth of strong opposition from Australia is too well known to require any labouring here, but Mr. Scholefield deals with the events which led up to the German annexations in a way which is bound to enhance the value of his book as a work of reference. Prince Bismarck's view, viz., that colonial extension was detrimental to the concentration of German power, gradually changed to an attitude favouring expansion in the Pacific, and the little story which Mr. Scholefield tells is instructive in the light of later events. We venture to give it here:—

"At a small dinner party at Lord Rosebery's house on 5th March (? 1885), Bright, Rosebery, Gladstone, and Count Herbert Bismarck were present, and the conversation turned quite frankly on German colonisation. Count Bismarck is reported as saying: 'We are the youngest of the great powers, and we wish to undertake this function of colonisation, which belongs to a great power. But we only hope to do it in a very small and humble manner.' Gladstone, says Lord Fitzmaurice, was much impressed with the conversation, and on returning to the House of Commons, he sat down and wrote to Granville insisting on a settlement of the New Guinea question."

The change of attitude at the Colonial Office under Mr. Chamberlain did a good deal to restore confidence, but the influence of the South

African war in 1899 hastened the agreement with Germany over Samoa, and it was unfortunate that the agreement was made in the teeth of strong colonial opposition, at the very time that Australia and New Zealand were taking a large share in the fighting overseas. Times have changed, and the plea of the Australian Interstate Commission, set up for the purpose of formulating an after-war policy, that there should be cohesion between the Imperial and Colonial governments is not likely to fall on deaf ears.

We cannot leave Mr. Scholefield's book without mention of what he calls the "Wrong Civilisation" in the British possessions, which, by carefully securing the title of the natives to their land, has put them beyond the need of work. Thus we have the spectacle, in Fiji and other places, of native populations existing in enervating indolence alongside of an imported race of labourers. "Polynesians and Melanesians are here and there a race of landlords, independent of their own labour . . . while the proportion of natives throughout the Pacific who are employed on the plantations of the Europeans is ridiculously small." The consequences of this idleness are partly made manifest in declining native populations, and Mr. Scholefield is of opinion that the industrialising of the natives, "even with some measure of compulsion," is essential in their own interests. This is a thorny subject, bristling with difficulties, which calls for very careful handling, for obvious reasons. Mr. Scholefield instances the native policy pursued in New Zealand in recent years, with a result that the Maori people have ceased to decline in numbers, and he pleads that this treatment of the Maoris by the white settlers of New Zealand "has given that dominion the best claim to administer the Polynesian groups which are under British sovereignty." It is probable that the administration of Samoa will give New Zealand her chance of proving her fitness in this way, but the office of High Commissioner for the Western Pacific is not likely to fall vacant yet awhile, and particularly if it appeared probable that a policy of imposing compulsory labour on the natives might be tried in practice.

Mr. Scholefield has spared no pains in making his history complete: it will be read and valued by all who wish to have a clear appreciation of the problems which lie ahead of us in the Pacific.

J. D. M.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Scottish Geographical Magazine.

At a Council meeting held on 21st October 1919, it was resolved that, owing to the high cost of printing, for the twelve months beginning in January 1920, the *Magazine* should be issued as a quarterly of 72 pp., the numbers to appear on the 15th of January, April, July, and October respectively, instead of as a monthly.

Diploma of Fellowship.

The Ordinary Diploma of Fellowship was awarded to Mr. Alex. S. Lawson, M.A.

The Annual Meeting.

The Society's Annual Business Meeting was held in the Rooms at Synod Hall on Nov. 6, the Hon. Lord Guthrie, LL.D., President of the Society, being in the chair.

The Secretary, Mr. Geo. G. Chisholm, submitted the Annual Report, which appears on p. 406 of this issue.

Lord Guthrie, in the course of a short speech, drew attention to the salient features of this Report, pointing out that it contained hopeful features, in addition to others which were a matter of regret. He said that, despite the close of the war, its after-effects for the Society were far from over, for its members, like those of other similar bodies, were largely drawn from the ranks of those who had suffered financially during its course. But though the membership had inevitably suffered severely during the war, there were indications that conditions were now beginning to improve. In contrast to some other societies which had been obliged to suspend activity during the war, the Royal Scottish Geographical Society had been able to continue all branches of its work, and though the lectures had been fewer in number, their quality had been admirably maintained. In regard to the coming session, it was only necessary to point to the two names of Sir Arthur Steel-Maitland and Sir Ernest Shackleton to show the standard reached. The lecture session opened at a comparatively late date—December 3—but this was entirely due to the natural difficulty of finding a date that would fit in with the numerous engagements of Field-Marshal Earl Haig of Bemersyde, who had accepted the award of the Society's Gold Medal in recognition of his distinguished services to the State, and who was to have the medal presented to him on the occasion of the opening lecture by Sir Arthur Steel-Maitland on "The Economic Condition of the Country, with special reference to International Trade."

As to the *Magazine*, while all must have regretted that a diminution in its size had been necessary, no one could suggest that the quality had deteriorated. During the session the "Edinburgh" issue, a unique production, had appeared, and had proved remarkably successful. Its appearance was the result of the equally successful exhibition of maps and plans which had been held in the Rooms in the spring, a kind of exhibition which it was hoped might be repeated in the future. The Society was under a great debt of gratitude to those who had arranged this exhibition, to those who had worked hard to make it a success, and finally to those who had made it possible to produce a permanent record of it in the shape of the remarkable "Edinburgh" number of the *Magazine*. In the organisation of the exhibition, the names of two gentlemen must be specially mentioned—Dr. J. G. Bartholomew and Mr. Harry Inglis, while Mr. Cowan had placed his time and unrivalled knowledge at the

disposal of the organisers, and at the opening proceedings had given an address on the exhibits.

In the preparation of the "Edinburgh" number acknowledgment was due to the Editor and to the writers of the interesting articles which it contained. Finally, it was necessary to make special mention of the beautiful map which formed the frontispiece, which was made and presented to the Society by Dr. J. G. Bartholomew. The map was one which had long been needed, and would prove invaluable not only to the expert but to the much larger body of amateurs.

In conclusion, Lord Guthrie said that he believed in the Society and in its future, and was certain that under the new President and the new Chairman of Council it would do in the future much more even than it had been able to do in the past.

The adoption of the Report was then moved by Mr. J. Hamilton Birrell, and seconded by Mr. David Chisholm, and unanimously carried.

Lord Guthrie then proposed the election of Lord Salvesen as ninth President of the Society. He stated that his predecessors, Lord Rosebery, the Duke of Argyll, the Marquis of Lothian, Sir John Murray, Prof. James Geikie, the Earl of Stair, and the Duke of Buccleuch constituted a long series of distinguished men, and in Lord Salvesen the Society would find one who would carry on the traditions of the past, and open up new avenues of progress.

Mr. Ralph Richardson seconded the motion, stating that Lord Salvesen had been a member of the Society since 1890, and had always taken the greatest interest in its welfare.

The motion having been unanimously accepted, Lord Salvesen took the chair. In thanking the Society for their mark of confidence, he said that he esteemed it a great honour to have been elected in direct succession to Lord Guthrie and in more remote succession to the distinguished men who had held the position of President previously. He also expressed the thanks of the Society to Lord Guthrie for the very eminent services which he had rendered to it, both during the period of his presidentship and for many years before, both as Vice-President and as Ordinary Member of Council.

Col. Sir Duncan Johnston then proposed Mr. H. M. Cadell of Grange as the new Chairman of Council. This was seconded by Dr. Bartholomew, and agreed to unanimously.

Dr. Horne then proposed Col. Sir Duncan Johnston as one of the Vice-Presidents of the Society, and Prof. Jehu and Mr. John Macfarlane, lecturer in geography at the University of Aberdeen, as Ordinary Members of Council. Both proposals were seconded by Mr. J. Hamilton Birrell and agreed to. The election of the remaining Members of Council and office bearers, as recommended by the Council, was then proposed by Mr. Clendinnan, seconded by Mr. William Lee, and agreed to. The proceedings then terminated.

GEOGRAPHICAL NOTES.

EUROPE.

British Commissioner for South Russia.—Mr. H. J. Mackinder, M.P., at the request of the Secretary of State for Foreign Affairs, has undertaken a temporary special mission as British High Commissioner for South Russia. The object of the mission is to endeavour to re-establish economic relations with the inhabitants of the vast territory now controlled by General Deniken. These inhabitants are estimated to number more than 40,000,000, and their lands are rich in raw materials, while they are urgently in need of manufactured goods. Mr. Mackinder is thus faced with a problem of great interest both from the geographical and the practical side, and his wide knowledge of the geographical factors which affect trade should stand him in good stead. Geographers will hope that, in addition to achieving success in the practical sphere, Mr. Mackinder will be able to enrich scientific literature by an account of his observations and deductions, which should be of great value.

Spitsbergen.—It was announced in the House of Commons, on October 31, that the Spitsbergen Commission, appointed by the Supreme Council in Paris, had advised that the sovereignty of the archipelago should be given to Norway, and that the British Government had agreed to the recommendation. It was added that the conditions attached to the treaty by which the sovereignty is conferred will adequately safeguard existing British rights.

Geological Work on the Western Front.—Captain W. B. R. King, who is to lecture before the Society in March, was one of two geologists appointed, in the earlier part of the war, to carry out scientific work on the Western Front, the other being Col. T. W. Edgeworth David, Professor of Geology at Sydney University. Captain King gave some account of the geological work done to the Royal Geographical Society last May, and his paper—one of extreme interest—appears in the October issue of the *Journal*. Col. David was chiefly concerned with problems connected with mining and the construction of dug-outs, while Captain King was occupied with water-supply, but their work overlapped to a certain extent. The paper, which is too detailed for an abstract, shows both the extreme importance of having competent scientific men to advise in matters connected with earth structure, and the close connection between pure science and practical applications. Among the curious little illustrations of the later point given in the paper, we may note that the geological staff discovered that certain German pill-boxes at the northern end of Vimy Ridge were made of gravel which was not of local origin, and was found to contain rock fragments which were subsequently identified as having come from the basin of the Rhine. The discovery proved of much importance in con-

nection with the "sand and gravel" controversy between Britain and Holland.

To the subsequent discussion on the paper General Edmonds contributed an amusing tale, obtained at first hand from Prof. Barrois of Lille, of the German method of dealing with the staff of geological experts employed at their Headquarters when the blowing up of Messines Ridge proved that they had been outwitted by the British.

Captain King's paper affords another proof, if indeed further proof is needed, that pure science, in time of war no less than in peace, is justified by its results in practical life.

Africa.

The Seasonal Winds of the Coast of Tunis.—In the *Annales de Géographie* for May 19, Lieut. J. Rouch describes the occurrence of seasonal winds of the monsoon type on the coast of Tunis. His tables and figures show that at Bizerta, Susa, Sfax, and Jerba the prevailing winds of winter blow from the land to the sea, the direction, at each station, being very nearly at right angles to the general trend of the coast. In summer, on the other hand, the winds blow from the sea to the land, and there is thus a seasonal reversal in direction. The phenomenon has, however, a very limited extension into the interior, for it ceases to appear at stations 124 miles from the coast. This fact suggests that it is to the thermal rather than to the barometric gradient that it owes its origin, for the latter shows no great difference when coastal and inland stations are compared, whereas the former is steep on the coast.

The Western Sahara.—Captain Augieras has constructed a map, on the scale of 1 : 500,000, of the little known Western Sahara, on the basis of his own journeys across the area, and those of the other explorers who have travelled in the region since the French occupation of the oases in 1900. The map, with accompanying text, has been published by the Paris Society of Geography, and the pamphlet summarises what is known of this singularly barren region.

As regards general morphology, the region, which has an area twice that of France, is totally devoid of important mountains. The centre is occupied by a dome-like plateau, built up of crystalline rocks, and studded with granitic bosses which form the eruptive belt of the Eglab. Round this central dome there extends in a circle a depressed, dune-covered region, forming the *erg*. Here the underlying rocks are concealed by the sand. Beyond the erg the ground rises again, the northern boundary being formed by the last slopes of the Atlas, which are not, properly speaking, a part of the Sahara.

Captain Augieras works out in some detail the probable earlier hydrographical system, but the point of general interest in regard to this is its relation to the origin of the dunes. These rise to a height of 650 feet, have a steep western and a gentle eastern slope, and are arranged in parallel lines, leaving between the rows open corridors,

varying in width from half a mile to about four miles. These corridors sometimes unite, but are sufficiently straight to allow easy passage in their own direction, which is generally from north-east to south-west. This arrangement facilitates movement over the desert. As to the origin of the dunes, Captain Augiéras is very definitely of opinion that they are closely related to the vanished river system. For a prolonged period, he holds, the Saharan rivers transported great masses of sand. When they dried up this sand was left in the deserted river beds. The deposit would at first be bound together by the roots of plants, as happens still in the semi-deserts of the Chad region, Timbuctoo, and so forth. As the climate became drier, however, the plants would die off, and the wind was able to act freely upon the loose deposits, and heaped them up into dunes. Thus the erg forms, as it were, a model in sand of the earlier river system.

Of the climate little is known, but though no continuous observations are available, some general points are clear. First, the presence of the sand dunes, which heat (and cool) with great rapidity, gives rise to very high diurnal temperatures. In 1913, between July 6 and September 3, the temperature each day reached or surpassed 122° F., the lowest night temperature observed during the period being 58° F. The limited observations made seem indeed to show that every summer there occurs a period, of varying length, when the diurnal temperatures regularly reach or surpass 122° F. (50° C.). During the cool season, the maximum varies from about 68° to 79° F., and the minimum from 41° to 50°, but during a few nights in the year the thermometer drops to freezing point or below. Sun temperatures are enormously high, and the sand becomes so hot that even the natives, whose skin is relatively insensitive, cannot walk bare-foot without being badly burnt.

This great heating up of the surface gives rise to a well-marked low-pressure area over the dunes, and in consequence there is a sharp contrast with the Eastern Sahara as regards prevailing winds. Whereas the former is a region of prevailing east winds (the Trades), in the western area the winds are westerly, and often violent, especially in March and April. November is generally calm, and, with a moderate temperature, is the most agreeable month of the year.

As regards the flora and fauna, a curious point is the enormous abundance of fragments of the eggs of the ostrich scattered over the surface. The bird is now very rare, but it must once have lived in vast troops. Parts of the Western Sahara are indeed now absolutely devoid either of animal or plant life. Trees are represented only by three species—the date palm, a spiny acacia (*A. tortilis*), and a tamarisk which is confined to the beds of the wadis.

The desert proper is scarcely inhabited at all. Round its margins there are a few sedentary groupings in areas where water is to be found. This may be obtainable from the usually subterranean water of a wadi, or by means of long galleries excavated underground in the slopes facing a depression. Finally, in the erg, it is sometimes possible to plant palm trees in the hollows of the dunes, their roots being able to reach the water of a vanished wadi. There are no true nomadic tribes, the desert

being too unproductive. Certain tribes from South Morocco, however, engage every year in pillaging expeditions, the victims being either the peoples in the vicinity of Timbuctoo or the inhabitants of the oases. The parties follow more or less well-defined tracks across the desert, but the exact direction depends upon the state of the pasturages *en route*, and all the paths are therefore temporary, being frequented or deserted according to the water supply in different years.

Finally, Captain Augieras gives a very curious account of the enormous number of stone implements, and other traces of primitive men, to be found in the desert area; in some places the ground is simply strewn with axes, arrow heads, stone knives, mortars and pestles, and so forth, and in others with worked fragments of ostrich eggs, apparently used as ornaments. But as yet nothing can be said of the history or date of these.

Australasia.

The Kauri Forests of New Zealand.—All descriptions of New Zealand contain some account of the wonderful forests of kauri pine (*Agathis australis*), which have both a scientific and an economic interest. The trees, it will be remembered, are remarkable for their great size, their limited distribution, and apparently feeble powers of natural reproduction, and for their production both of valuable timber and of gum. Most authorities call attention to the rapidly dwindling area under kauri, and not a few have expressed the opinion that the tree is doomed to speedy extinction, and that the reconstruction of the original forests is impossible. Mr. D. E. Hutchins, however, who has been investigating forestry questions on behalf of the New Zealand Government, takes a very much more hopeful view of the whole problem. The Department of Lands and Survey, New Zealand, has issued as a small pamphlet his report on the Waipoua Kauri Forest, the most important of the remaining forests of this tree, and this pamphlet contains in addition some general notes on the other, less important, kauri forests of North Island.

The Waipoua Forest lies to the north-west of Auckland, in a somewhat inaccessible area in the vicinity of the Waimamaku River. As now demarcated it covers an area of about eleven miles by nine, in a region of heavy mean rainfall, the annual average being apparently well over 100 inches. The soils within the forest area are poor, the dampness renders the country useless for fruit, and not good for sheep, while the poorness of the pasture makes the keeping of dairy cattle relatively unprofitable. It is estimated indeed that it takes about five acres of ground to feed one cow. Mr. Hutchins is, however, of opinion that it is possible to restore the forest, which is at present not in good condition, and that this process of reconstruction is the most profitable way of using the land, and would also give more employment than could be obtained on the cleared land.

At present the stand of timber is low and uneven. Even in the kauri belt—so-called—there may be only one kauri tree over ten acres, while the maximum stand of these trees is fifty to sixty per acre. The

cubic content of timber of the individual trees may, however, be enormously high, and this is especially true when the kauri stand is thin, and the trees scattered among other species. In nearly pure stands the tree never appears to grow to great dimensions. On the other hand, Mr. Hutchins maintains that individual kauri trees have in the past reached a greater size than any known tree, surpassing even the Californian Sequoias. He mentions two examples, in an area adjacent to the Waipoua Forest, each of which contained 295,788 superficial feet of sawable timber, about double the amount of the largest of the Californian big trees known, and equivalent to the timber production of nearly three acres of good European forest.

As regards natural regeneration, Mr. Hutchins states that though there is little evidence of this in the interior of the Waipoua Forest, it does occur upon its margins. The seed has apparently the power of lying dormant for many years, and only germinates when the conditions are favourable, especially when light is admitted. In other words, it would appear that, in harmony with the slow growth and longevity of the tree, reproduction is slow, and occurs naturally for the most part only when forest fires or destruction by wind makes a break, in which seedlings may spring up.

Proposals are made for the working of the forest and for forest improvements which, it is calculated, would during a period of a hundred years give the same average amount of employment and average money returns as successful dairying in this region. At the close of this period, the reconstructed forest would give far higher profits, and much more employment than dairying.

General.

Personal.—M. Emmanuel de Margarie has been appointed Director of the new Geological Survey of Alsace and Lorraine. M. de Margarie, it will be remembered, is responsible for the French edition of Suess's *Antlitz der Erde*, which is much more than a translation of the original, and is believed by some to be the form in which the great book is destined to live. M. de Margarie's work has been geographical as well as geological, and he is admirably fitted to solve with success the difficult problems presented by the restored provinces.

Economic Geography.

Trade between India and Japan.—The great increase in the trade between Japan and India during the war is a phenomenon which has, perhaps, received less attention than its importance warrants. Some thirty years the trade between the two countries was trifling; but in the year 1917-18 the total exceeded that with all other countries except the United Kingdom. The increase over the pre-war average was 400 per cent. for imports, and 103 per cent. for exports, the total trade being valued at Rs. 52 crores, as against about 5 lakhs thirty years ago. In 1917-18 Japan replaced the United Kingdom as the

largest supplier of beer to India, a curious incidental result of war conditions here.

Light Railways versus Motor Transport.—To the October issue of the *Geographical Journal*, Major W. Waters Van Ness contributes an interesting article on the place of light railways in facilitating communication in new or undeveloped countries. It has been suggested, notably by Col. Napier in the case of Persia, that motor transport is preferable to railways in such cases. While Major Van Ness agrees with this in so far as standard gauge lines are concerned, he considers that the experience gained in France during the war proves that light railways of 30 cm. (2 feet) gauge can be constructed more rapidly and cheaply than standard gauge lines, and in most cases are cheaper to operate than motor lorries. Petrol or steam driven lorries can, he says, only compete with light railways as collectors and distributors of goods when the source or destination of the goods is uncertain, or the tonnage small, or where, as in a thickly populated country, the cost of a right-of-way for a light railway would be prohibitive, while motor roads are already in existence. On light railways carrying large and regular traffic he regards light steam locomotives as the most economical and efficient. They can be fitted to burn wood, coal, or petrol, and, under the conditions given, are better than motor tractors.

He concludes his paper by giving a short list of promising routes for light railways in Asia Minor, specifying in each case the nature of the traffic to be expected.

The World's Chemical Industry.—We may draw attention, without attempting an abstract, to the presidential address to the Chemical Society delivered by Sir William J. Pope, F.R.S., in March last, and reported in *Nature* for May 15th, under the title of "Chemistry in the National Service." The paper is largely of a technical nature, but indirectly it throws much light upon the probable future of the chemical industry in Britain, the United States, and Germany respectively, while at the same time incidentally it draws attention to the injurious effect on British industry of Governmental control during the war, and the economic effects of war taxation. The account given of the work of German scientific chemists and of the painstaking and efficient organisation of large scale production in that country confirms along a different line what has often been said by others in regard to the nature of German competition, while the detailed illustrations of the way in which war measures have favoured foreign, and especially American, manufactures as against British are both curious and instructive. Though, as stated, the paper is technical in outlook, it raises a number of questions of great importance in economic geography.

The Larger Relations of Climate and Crops in the United States.—Prof. Robert Ward read a paper with this title before the Royal Meteorological Society last year, and the paper, with a very full bibliography, appears in the January *Quarterly Journal* of that

society. It contains a reproduction of the map published by the U.S. Department of Agriculture showing the agricultural provinces of the States. The most interesting point about the map is the arrangement of the provinces east of the 100th meridian, which in a general way coincides with the annual rainfall line of 20″. Five provinces are shown in the area east of this meridian:—(1) the hay or pasture province of the north-east; (2) the spring wheat region in the north; (3) the central "corn" and winter wheat belt; (4) the cotton belt to the south; (5) the narrow coastal belt, with its sub-tropical fruits and sugar-cane, widening in the peninsula of Florida.

"Corn" (maize), with its demand for summer heat and moisture, is widespread, especially in the Mississippi valley and the eastern States. But while in the northern part of the range it is used chiefly for feeding stock, in the south it forms human food. Though widely grown in the cotton belt, it is there subordinate to cotton. Winter wheat is limited in its northern extension by cold winters and dry springs, and in its southward both by the increase in summer rain and by its competition for labour with the more profitable cotton. Cotton demands labour all the year round, and especially at the seasons for sowing and reaping winter wheat: in the area where it thrives it tends to oust other crops. Tobacco grows best in the east and south-east part of the corn and winter wheat-belt, but in northern New England it is produced under artificial covers, especially of cloth.

The paper as a whole not only gives interesting details as to the climatic controls of the different crops, but brings out clearly the fact that climate is but one of the causes which determine the geographical distribution of the chief agricultural products in the States.

EDUCATIONAL.

Gilchrist Studentship in Geography.—We are informed that the Gilchrist Trustees are again offering, for the year 1920-21, a studentship of the value of at least £80, tenable at any recognised school of geography, for the improvement of the teaching of geography in schools. Applicants must have had at least two years' experience in school work, and should send three testimonials, references, and a full account of their careers to Prof. L. W. Lyde, University College, Gower Street, London, W.C. 1, before the end of January 1920.

NEW BOOKS.

EUROPE.

The Evolution of Modern Germany. By William Harbutt Dawson. London: T. Fisher Unwin, 1919. *Price* 21*s. net.*

This is a new and revised edition of a book first published in 1908, the revision being carried down to November 1918. In his preface to the new edition the author states that he considers any forecast of the New Germany impossible meantime, and has limited himself to such revision "as has been practicable,

special attention being given to the completion of statistical data." So far as we have tested the book the alterations do not appear to be very great, and it presents a picture of Germany as she was, and as she was regarded by a more or less sympathetic observer, in the early years of the present century. The great interest of the volume to the present-day reader must lie in his individual attempt to trace the causes which led to the development of the Germany who revealed herself in the years 1914-18 from the state depicted by Mr. Dawson.

The Bulgarians in the Past. By D. Mishew, Member of the Bulgarian Academy of Sciences. Lausanne: Librairie Centrale des Nationalités, 1919. *Price* 8 *frs.*

The Bulgarians and Anglo-Saxondom. By Constantine Stephanov. With Maps. Berne: Paul Haupt, 1919. *Price* 12 *frs.*

These are two Bulgarian propagandist works, the latter, intended chiefly, it would appear, for a Transatlantic audience, being devoted to urging Bulgarian claims in Macedonia. It is interesting to note that, in contrast to other apologists, who maintain that Bulgaria was misled by her king and the pro-German clique, Mr. Stephanove states that—"Those who assert that Bulgaria's third war was not undertaken with the enthusiasm and full support of the people are simply playing the politician." He adds, in his quaint English, "The Bulgarian felt he was called to perform a supernatural mission, he could not describe it what."

The Pictish Nation: Its People and its Church. By Archibald B. Scott. Edinburgh: T. N. Foulis, 1918. *Price* 25*s. net.*

Mr. Scott has collected in this book a vast amount of information, and has taken much pains to make his record complete. The material available for investigation is unreliable, and there are few points on which historians and antiquarians have been more at variance with each other than respecting the real race of the people known as Picts. Where there is so much room for conjecture it is not surprising to find that the Picts have been set down as Scandinavians, Germans, Welsh, Gaels, or something different from all four. In dealing with the race question Mr. Scott had the advantage of the works of men like Skene, Dr. Alexander M'Bain, and Professor Watson.

He discusses the kingdom of the Picts, and three maps are supplied showing Pictland according to Ptolemy, the distribution of Britons, Picts, and Gaels, and the range of the churches of the Picts. He then describes the Pictland of Alba (Scotland), and the language, literature, and lives of the Picts. For his material Mr. Scott depends mainly on the records of the early Church, and when one remembers that many of these were written two or three hundred years after the events which they chronicle took place, it would be foolish to place much reliance on their accuracy. Mr. Scott shows strong bias in favour of the records of the Pictish Church as against the Scottish, which is unfortunate in any historian. His conclusions would in many cases be more convincing if he had supplied references: *e.g.*, on page 55, he says: "That there was a Pictish literature in Alba (Scotland) before the Vikings is beyond doubt. The evidence is too strong even for cynical historical writers," but no reference is given to support this statement.

His dealing with the place names shows a want of local knowledge—a fact which is fatal to the correct interpretation of a name. Bangor, which means spurs or peaks, he says meant a religious community, and Annat, a mother church. The latter, as far as application goes, is doubtless correct, but the name seems to go back beyond the introduction of Christianity, for, in the Irish mythology, Ana is

said to be the mother of all the gods. Cairn he associates with a heap of stones, but it is also applied to mountains, and Càrn Lougie (locally, Càrn Lagaidh) is a hill nearly 2400 feet high.

Doubtless, as the author states in his preface, a history of the church and nation of the Picts is centuries overdue, but while he has added much to what was already known, there still remains a large amount of evidence to be sifted, and we should like to see the Historical Society taking this matter up.

The East of Arran: A Guide-Book for the Young of all Ages. By A. Boyd Scott, M.C., B.D. Paisley: Alexander Gardner. 3*s.* 6*d. net.*

This is an account in simple language of the archæology and history of the east of Arran. The author divides his subject into six sections dealing respectively with The Giants, The Holy Island, The Vikings, The Bruce, The Fairies, Ships and Smugglers. Each section is again divided into two parts, the first giving the facts regarding the subject, the second consisting of a story based on the facts and making them vivid and alive. The author is quite successful in his limited aim, which makes one regret the more that he did not include the whole island in his survey. His stories show that he possesses considerable literary gifts. They are told with gusto, humour, and vigour, and succeed in giving a graphic reconstruction of the periods of which they treat. We can recommend the book to all lovers of Arran who do not care to tackle the weightier works on the same subject. Mr. Boyd Scott should look up the etymology of *fuchsia*.

Belgium under the German Occupation: A Personal Narrative. By Brand Whitlock, U.S. Minister in Belgium. 2 vols. London: W. Heinemann, 1919. *Price* 25*s. net.*

Brussels was rudely awakened on 1st August 1914 when it heard that the Germans had invaded Luxemburg. It was dismayed when the German Minister to Belgium handed to its government Germany's ultimatum demanding Belgium's acquiescence in invasion. The answer of Belgium was prompt and heroic. In the National Palace the King amid universal applause refused the ultimatum and exclaimed, "Vive la Belgique independante!" German troops immediately invaded Belgium.

On 20th August the German hosts entered Brussels, and the author saw them filing by for two hours in a great grey-green stream. Describing their entry, he says: "There were Germans of all the familiar types,—all young men, strong, with long backs and short stout legs, hard thews and sinews, and all individuality, all initiative, had been drilled out of them; they plodded on with the dumb docility of fatalism, and their officers, across the gulf that militarism places between officers and men, were as contemptuous of them as they were of the awed crowds along the sidewalks." For three days and three nights the field-grey hosts wound through the city, and then a demand was made for a payment by 1st September from the province of Brabant of 450 million francs.

On 26th August General von Luttwitz, in command at Brussels, announced to the author during conversation that the German General at Louvain, while talking with the Burgomaster, had been shot by the latter's son, adding "And now, of course, we had to destroy the city. The orders are given and not one stone will be left on another." The author afterwards learnt that von Luttwitz's statement was a lie, as "the Burgomaster of Louvain had no son, and no German general or other officer was killed at Louvain." He also heard that the massacre and destruction at Louvain originated in German troops meeting after dark, and, mistaking

each other for Belgian troops, firing on each other, whereupon the Germans wreaked their vengeance on the innocent civilians of Louvain and burnt its Cathedral, its Library, and its Hotel de Ville. "Louvain," says the author, "will remain perhaps the classic instance of *Schrecklichkeit*; it resumes and sums up in the general mind the sinister history of those terrible times. But it was not the worst: Visé was worse, and so was Dinant, and so was Aerschot; and worst of all, perhaps, was Tamines."

"When the German soldiers entered Belgium they were in such a highly excited state, in a condition of such fear, that they saw a *franc tireur* in every peasant, in every peaceful civilian; the lightest sound, the crackling of a twig, the slamming of a door, brought the cry 'Man hat geschossen!' and the stampede and carnage began. Even officers were not free from the obsession." In Dinant, "a platoon was called up; the colonel in command gave the word to fire, and the grey soldiers in cold blood shot down ninety persons as they stood huddled together. Among them were twelve children under the age of six years, six of whom were little babies whose mothers, as they stood up to face their pitiless murderers, held them in their arms."

The author remarked that, during the war, the hatred of the English by the Germans "was a wild implacable thing, not to be overcome. It had a quality almost personal in its intensity. 'We are going to continue this war,' said a German official to me, 'until one can travel around the earth without seeing Englishmen who act as if they owned it.' 'We shall destroy England if it takes twenty years,' said a general to me one evening; his eyes blazed wrath, and he clenched his fists spasmodically; 'when our men take English prisoners,' he went on to say, 'the officers dare not turn their backs an instant, lest the men kill them.'"

In December 1914 the author was presented to the Governor-General of Belgium, Baron von Bissing, "a man whose name, justly or unjustly, was destined to stand forth to the world as the symbol of one of the darkest, cruellest, and most sinister pages of its miserable history." The new Governor-General's first act was to impose on the population of Belgium a contribution of war amounting to 480 million francs. A very different man, whose acquaintance the author shortly afterwards made, was Cardinal Mercier, whose appearance was as pleasing as that of the other was repellent. Yet "the supreme authority and the source of all power and privilege was the Governor-General von Bissing, delegated by the Emperor as his personal representative and responsible to him alone. The Kaiser, in his rôle of war lord, had an absolute right, emanating from military force, in the conquered territories. This power, for occupied Belgium, was delegated to the Governor-General." Von Bissing was the man who, with General Sauberzweig, the Military Governor, sanctioned the execution of Edith Cavell on 12th October 1915, despite the best efforts of the American Legation. Full details of her trial are given in the second volume of this work.

"Why," asks the author, "was Miss Cavell singled out among the others as the one to be shot at dawn on the morning after condemnation? Why, if justice, even rude military justice, were being done, were not all shot who had been condemned to death? Why this signal distinction, this marked and tragic discrimination? Because Edith Cavell was English; that was her offence."

Later began what the author terms the "Stripping" of Belgium. "First, all the fine old walnut trees were cut down by the Germans in order to make stocks for their rifles. Then they seized other things, vicinal tramways, the metal in houses, rubber, wool, everything that could aid or comfort an army, while it went about its systematic and scientific destruction of all that which centuries had been

required to build or produce. Even the machinery in the factories was being shipped off to Germany, and Belgium faced a future in which she would find herself stripped naked of all she had."

In 1916 the Germans issued a decree that in future the courses in the University of Ghent were to be given in the Flemish and not the French language. This was done in the hope of dividing the Belgians and preparing them for being annexed to Germany. But the Professors of Ghent University rebelled against the decree. The celebrated historian, Professor Paul Frederieq, himself a Fleming, was one. Professor Pirenne, the author of the monumental history of Belgium, was another. The Germans arrested both, threw them into prison, and eventually deported them to Germany.

All this time, and ever since the German occupation, the author was busily engaged helping to feed the starving Belgians with the aid of the resources and organisation so splendidly furnished by the people of America represented by the energetic Mr. Hoover.

"The German officers were arrogant enough in Brussels, but the capital was spared many of the indignities that they visited upon the provinces. In the smaller towns civilians were required to salute German officers by raising their hats, and in some places the men not only had to lift their hats but men and women both had to step off the sidewalks when the officers passed." The German Courts also pressed heavily on even citizens of the best class. The Grand Rabbi of Belgium was sent to prison for six months because of a sermon to which German soldiers took umbrage. Dr. Bull, an Englishman, was sent to prison for three months and fined 5000 marks, and the Abbé Vogel was condemned to twelve years' imprisonment with hard labour because they assisted two medical students to reach the frontier.

A notice was issued in Brussels by General Hurt, Governor of Brabant, forbidding the celebration in any manner of way of the Belgian national *fête* on 21st July 1916. In one shop the proprietor displayed portraits of the King and Queen of the Belgians. "He was at once arrested and the shop closed and a little *affiche* put in the window giving the reason; and when a crowd gathered to read the *affiche*, the *Polizei* charged them, clubbing the people, men, women, and children, with the butts of their guns." Yet in the Cathedral of Ste. Gudule Cardinal Mercier preached to an overflowing congregation, and said that "the dark days from 1914 to 1916" would yet prove the happiest and most fecund in Belgium's national history, for *per crucem ad lucem*—through sacrifice to light." That evening the Cardinal was greeted in the street by an enthusiastic crowd which so irritated the German authorities that they inflicted upon Brussels a fine of one million marks!

Then came what the author calls the "terrible days of the autumn and winter of 1916," when the German authorities seized the men of Belgium wholesale and deported them to work either in Germany or France for the German army. "Written appeals poured into the Legation: pathetic notes of letters in French, in Flemish, looking to America in the latest hour of agony. Women came in person, often tramping in from distant villages, to tell of husbands and sons torn from their homes, boxed like cattle in freight-trains, and sent off—they knew not where."

The rupture of diplomatic relations between Germany and the United States in February 1917, because of Germany's renunciation of her solemn assurance regarding her submarine warfare, was followed in April by a Declaration of War by the United States. Mr. Brand Whitlock and his family left Brussels on 2nd April, a great crowd of Belgians seeing them off with every sign of affection and

regret. The Minister of the United States had nobly represented his country, and in these volumes has reared a monument not merely to Belgium but also to himself.

ASIA.

Reminiscences of an Ancient Mariner. By John James Mahlmann. Yokohama: *Japan Gazette* Printing and Publishing Co., 1918.

A chatty, and often amusing, but on the whole somewhat commonplace, account of the adventures and experiences of an old sea captain in the South Seas and Japanese ports during the sixties and seventies of last century. In the year 1887 Captain Mahlmann was appointed Harbour Master at Kobe, where he evidently "made good," and in recognition of his services was decorated in 1894 by the Japanese Government with the Order of the Rising Sun.

Of some interest is the author's description of the ancient walled terraces and ruined forts of Ponape, one of the Caroline Islands. "Many of the stones used in the construction of the walls are over twenty feet in length, and more than eight feet in circumference, and must have been brought many miles from the centre of the main island." The canals which separate the smaller islands are also faced with stones, on one of which he detected "what seemed to be Chinese characters," but almost obliterated. His copy of the inscription was unfortunately lost, and the incised stone is now missing.

The Addenda to the volume include notes on the Kuro Shivo or Japan Stream, a current often dangerous to shipping, off the south and south-east coasts of Japan. There are also remarks on the occurrence and theory of typhoons in the Japanese seas.

Houseboat Days in China. By J. O. P. Bland. London: William Heinemann, 1919. *Price 7s. 6d. net.*

This is a new edition of a book, originally published in 1909, and containing accounts of shooting trips on the Yangtse, carried out by means of a houseboat. It has been apparently republished unaltered, save for a brief dedication to an army friend, and except for this is utterly remote from the world of the last five years, alike in outlook and in description. Lightly and pleasantly written, and containing numerous little touches which bring out vividly the conditions of life in rural China, it gives an interesting picture of a physical world remote in space, and a mental world which seems now as remote in time; for the author's reflections and discussions deal with subjects which have been for the most part driven from our consciousness by the war and its problems. But if the book contains, in the author's words, "little geography, and even less science," it helps, nevertheless, to complete the geographer's picture of Changeless and Changing China.

China of the Chinese. By E. T. C. Werner. London: Sir Isaac Pitman and Sons, Ltd., 1919. *Price 9s. net.*

In this new volume of the "Countries and Peoples" series, Mr. Werner has given us a most learned and yet most readable account of Chinese institutions, sentiments, ideas, language, and what he calls "products"—*i.e.* land works, houses, food, clothing, implements, etc. He has searched diligently and with much success into what we, with our short history, call the mists of antiquity to discover the origins of the customs and manners that we label Chinese. While he traces marriage and funeral customs, ceremonials, politics and religion in a logical

and historical manner, he has also managed, despite the disclaimer in his preface, to give us a peep at the Chinese under republican government, and we see many things which we have long regarded as typically Chinese either passed away or in the process of passing.

Of such an encyclopædic volume one cannot give a really adequate summary, but simply state that the student of China and her people will find here not only facts but an interesting and most suggestive collection of explanations and theories relating to these facts. In a haphazard way one may select subjects like pig-tails, small feet, the effect of the introduction of tea, Diabolo, Planchette, opium, gunpowder, architecture, and discover all that it is necessary to know about each in Mr. Werner's book.

Of the future of the country, knowing well from personal contact the character of its people, the author is not too optimistic. The influence on the Chinese of the Westernisation of China is not all for good. One agrees heartily with Mr. Werner when he writes, "Both utilitarianism and art are offended by the substitution for the graceful Chinese dress of the inappropriate Western style of clothing." The Chinese costume is in most respects "the healthiest form of clothing for the climate of China, covering most of the parts which should be covered, though in the cold weather advantage would be gained by substituting fewer woollen garments for the numerous cotton ones piled on in order to secure warmth. The general adoption of the foreign style of clothing is as much a mistake as the growing adoption of the red-brick house" (p. 283). Speaking more particularly of the Chinese seaports in his lecture to the Society, Mr. Cheng said (*S. G. M.*, xxxiv. p. 291), "The energy, the cheerfulness, and the capacity for hard work of the Chinese will probably fill casual visitors with amazement and joy. In Tientsin, in Shanghai, in Canton, and in several other commercial towns, you will find that they are as pushful as Chicago, as noisy as Liverpool, and as distasteful as the East India Docks at the east end of London." Part of what is connoted in the Western mind by the latter part of Mr. Cheng's sentence finds an echo in Mr. Werner's book. "Besides general temperance, the moral traits of the Chinese include a very high sense of mercantile honour and great industry. . . . The sad part of the matter is that the former is said to have been declining of late years" (p. 228). One thinks of Japan in both connections.

While admitting freely that China has Westernised her fighting forces as fully as Mr. Cheng claimed (*S. G. M.*, xxxiv. p. 294), Mr. Werner goes on to say, "China may get together huge armies, but it will be a long time before she is in a fit state to take part in a war such as that now being carried on in Europe. . . . The Chinese troops would have been unable to 'stick it,' and would have 'had enough' of it long ago, and would have deserted without being shot, because their leaders would have deserted as quickly or quicker than they. China is threatened with aggression, and resistance to aggression is a duty, both in individual and national life" (p. 186). "The crux of the whole matter lies in the question whether the racial character of the nation will allow her to become strong and coherent enough for resisting aggression, developing her own resources, and reforming administrative corruption before other interested nations step in, on one pretext or another, either to 'protect' her or to seize some more of her territory. Only by sinking individual interests and uniting for the national welfare can she hope, in the absence of higher codes of international morality than those now universally prevalent, to retain her national integrity and independence" (p. 28). Such is the problem that the Chinese Parliament has to solve for a people divided against itself.

The volume has an adequate index and a political map. Fourteen good plates

illustrate a book with which we recommend teachers and other interested readers to make themselves familiar.

A Handbook for Travellers in India, Burma, and Ceylon. Tenth Edition. London: John Murray, 1919. *Price* 24*s.*

The preface to this new edition is dated April 1, 1918, though the book was not published till the present year. In addition to this unavoidable delay at the last the editor speaks of the serious difficulties encountered during its preparation, and of the loss of valuable material as a result of war conditions. Necessarily, therefore, the differences from the ninth edition, published in 1913 as the result of a complete revision, are not very great. The book will be welcomed, however, by those desirous of taking full advantage of the restored liberty of travel.

AMERICA.

The Diary of a Vice-Chancellor [*A. E. S.*]. Cambridge: At the University Press, 1919. *Price* 6*s. net.*

The Vice-Chancellor, whose identity is not very obscurely veiled, especially since he alludes to his zoological tastes, was a member of the British University Mission to the United States in the autumn of 1918. During his tour he kept a private diary, here published in book form. The matter is more than a little "thin," but has been carefully padded out with scraps of general information. Thus the fact that the author wore a life jacket on the way across enables him to fill four pages with an account of kapok fibre: an account of sargasso weed occupies three pages, for, after all, the party saw some floating weed during the voyage. Again, though they did not see an alligator at New Orleans, they obviously might have done so, so that some two pages are quite satisfactorily devoted to these interesting animals.

A. E. S. is fond of a joke, though he evidently prefers the simpler varieties. We recommend to his notice a pretty piece of irony by John Hill Burton on the subject of book-making; he might obtain some hints which would enable him next time to diverge even more widely from the paths of relevance.

GENERAL.

The Statesman's Year Book: Statistical and Historical Annual of the States of the World for the Year 1919. Edited by Sir John Scott Keltie, LL.D., and M. Epstein, M.A., Ph.D. Fifty-sixth Annual Publication. London: Macmillan and Co. *Price* 18*s. net.*

In the new volume of this most useful annual the editors have dealt, so far as that is possible, with territorial changes resulting from the great war. The single map that Dr. Bartholomew has prepared shows provisionally the partition of Europe under the Treaty signed at Paris in June. The boundaries of resuscitated Poland and of the new Czecho-Slovakia and Yugo-Slavia as well as of the proposed League of Nations' Territory are clearly shown. The various republics of what was once Russia are delimited. Altogether Europe assumes a new political aspect, though one that scarcely promises permanence.

In the letterpress Czecho-Slovakia is treated under Austria-Hungary and Yugo-Slavia under Austria-Hungary and Serbia, a concession to the provisional nature of the division rather than to an accustomed arrangement that will die hard. Similarly Poland is treated under Russia, where also available information regarding the young unstable republics is given. The German Republic, established on

November 9, 1918, is as fully treated as data permit; most of the statistics are pre-war, and one wonders whether the economic truth will ever be wrung from these war years. In the same section Germany's lost colonies are described. A new section has been devoted to Iceland, which since December 1, 1918, has been acknowledged a free state "united with Denmark only through the identity of the sovereign."

In many ways the fifty-sixth issue represents a transitional period, and for that reason alone will be a most valuable work of reference. But, in addition, a complete diary of the war, followed by the latest estimates of the war expenditure of the Dominions and of the world's casualties; the text of the Covenant of the League of Nations (with a useful bibliography of that millennial scheme); and a summary of the Draft Peace Treaties with Germany and Austria, are of permanent value to public men.

Under such difficult and unsettled conditions as obtain at present the editors' task must have involved much worry and consideration. That Sir John Keltie and Dr. Epstein have been successful in maintaining the high standard they have set themselves, that, thanks to their careful and laborious research, they have not mistaken shadows for substance and produced an ephemeral volume, shows once again how seriously they regard their work of compilation, and indicates to those who use the book how trustworthy the contents are.

Unconducted Wanderers. By ROSITA FORBES. London: John Lane. *Price 12s. 6d. net.*

This amusing and brightly-written book of unconventional travel describes the "strange journeys through the back of beyond" of two ladies who, weary of war work—the one as hospital nurse, the other as motor driver in the A.S.C.—suddenly resolved, for rest and recreation, to "go right away round the world."

Starting their journey on orthodox lines enough—New York, the Middle West, California, the Yosemite and the Big Trees,—from Frisco they "sailed away in search of real sunshine and the crowded languorous life of the unthinking tropics," and in the South Sea Islands, from Hawaii to Fiji, were admitted into the daily life of the kindly natives, sharing their huts and food, and even joining in the ceremonial "Siva" dance at the wedding of the chief's daughter at Apia. A strange story of Fijian hypnotic witchcraft was told to the author by its subject, a District Commissioner, who, having challenged the witch-doctor, nearly succumbed, after a night-long struggle, to the hypnotic power of the old native twenty miles away.

Passing over the adventures of the author and "Undine" in New Guinea, Java, and the Malay States, we find the travellers proposing to cross Cambodia from Chantaboon to Angkor. The British Consulate was not encouraging.—"Quite impossible. You can not go. We do not permit it. You might meet a tiger or a wild elephant." The French Consulate, however, bowed with Gallic charm. "All France is at your service. Under her wing you can travel anywhere." Undeterred by British pessimism they set out, and, by various means of progression, pony-back, motor-car, bullock-cart, boat and elephant, and after many mishaps, reached the "great grey city" of Angkor, "a city of mighty palaces, exquisite artificial lakes, and stupendous terraces, reigning supreme among the perished cities of the old world."

From Saigon they crossed in a Chinese rice-boat to Hongkong, but, weary of shopping in the bazaars of Canton, resolved to trek north to Hankow and the Pekin railway, regardless of the fact that the country through which they would

have to pass was in the throes of war between the Northern and Southern armies. Refused a passport, these intrepid ladies boarded an ammunition train, and travelled to railhead in company with forty coolies and a prisoners' guard, and from Shui-chow poled up the North river and down the Sian. Below Chin-chow they were held up by an officer, who most sensibly replied to all their arguments, "You get killed in Europe—no trouble. Perhaps you get shot here—very much money cost!" A further attempt to cross the lines by land was also frustrated, and, after many surprising adventures, they returned to Hongkong and civilisation, not having had their clothes off for three weeks and having lived almost entirely on eggs mostly bad. Their further travels through Northern China and Korea to Japan were comparatively commonplace, and we leave the pair taking passage in the *Fushimi Maru* for Victoria and Seattle.

Mrs. Forbes wields a graphic pen: she can in a few words present a vivid picture of her impressions and her surroundings. Witness the following description of Canton—"All the spices of the world mingle with the smell of oil and hot humanity: all the colour of the world flows down from the open shop fronts in store of oranges and golden shaddock; in wealth of gorgeous embroidery; in fantastic shapes of jade and crystal; even in massed scarlet cakes and saffron macaroni: all the disease and suffering of the world looks out from under the matted hair of lepers, or from the kohl-darkened eyes of child-women . . . the genius of Canton is something primæval, fierce and grasping, hiding raw wounds under gorgeous silk, clutching at knowledge and wealth behind a veil that is never lifted."

In conclusion, one cannot but admire the pluck and energy that carried these young ladies through so many difficult and even dangerous situations. We must also commend the patience, courtesy, and unbounded hospitality of the many officials, British, French, and native, who did so much to help them on their way.

The author makes a curious slip in describing the "bird-dance" of the Papuans as "exactly like the alternately grotesque and dignified posturings of Great Bustards on a Scotch moor in the mating season." We can but conjecture whether "blackcock" should be substituted for the bird or "the plains of Andalusia" for the locality.

The volume is illustrated by a large number of interesting photographs taken *en route*.

EDUCATIONAL.

The Use of the Terrestrial Globe: A Practical Little Book of Explanatory Notes, Diagrams, Problems, and Tables. London: George Philip and Son, Ltd., 1919. *Price 2s. net.*

This little book brings together in a handy form much useful information with regard to the terrestrial globe, and the use which can be made of it for instructional purposes. Most of the information, however, can be got from a good physical geography book, and it is the second part of the book, which shows how to use the globe in working out practical problems, that is really valuable. These problems remind us of early Victorian days when the "uses of the globes" was considered a part of the curriculum of a "polite" education: but it is difficult to imagine the modern teacher having much time to spend in this way. Some useful conversion tables are added, but the whole book is disappointingly scrappy, and the price charged for it seems hardly in accordance with its modest pretensions.

BOOKS RECEIVED.

The Land of Promise. By the Rev. H. C. Harding. With a coloured frontispiece by J. Fulleylove, R.I. Crown 8vo. Pp. 116. London: Church Missionary Society, 1919. *Price* 2*s. net.*

Poland the Unknown. Translated from the French of K. Waliszewski. Crown 8vo. Pp. x+263. London: William Heinemann, 1919. *Price* 10*s.* 6*d. net.*

Poland and the Poles. By A. Bruce Boswell, M.A. Royal small 8vo. Pp. x+313. London: Methuen and Co., 1919. *Price* 12*s.* 6*d. net.*

The Mastery of the Far East. By Arthur J. Brown. Illustrated. Royal small 8vo. Pp. ix+671. London: G. Bell and Sons, 1919. *Price* 25*s.*

Eskimo Grammar. By Rev. E. J. Peck. Royal small 8vo. Pp. 92. Ottawa: Geographic Board of Canada, 1919.

In the Wilds of South America: Six Years of Exploration in Columbia, Venezuela, British Guiana, Peru, Bolivia, Argentina, Paraguay, and Brazil. By Leo E. Miller. Crown 8vo. Pp. xiv+428. London: T. Fisher Unwin, Ltd., 1919. *Price* 21*s. net.*

The Great South Land: The River Plate and Southern Brazil of To-Day. By W. H. Koebel. Crown 8vo. Pp. xiv+314. London: Thornton Butterworth, Ltd., 1919. *Price* 15*s. net.*

Problèmes Économiques d'après Guerre. By L. de Launay. Crown 8vo. Pp. 319. Paris: Librairie Armand Colin, 1919. *Price* 3 *fr.* 50 *c.*

Cuba: the Land of Opportunity. By George C. Musgrave. Fcap. 8vo. Pp. 103. London: Simpkin, Kent and Co., 1919. *Price* 1*s. net.*

Europe in the Melting Pot. By Dr. R. W. Seton-Watson. Crown 8vo. Pp. xiii+400. London: Macmillan and Co., 1919. *Price* 4*s.* 6*d. net.*

The Pacific Islands: A Handbook. By Percy S. Allen. Crown 8vo. Pp. 286. Sydney: McCarron, Stewart and Co., 1919. *Price* 11*s.*

Accounts Rendered of Work Done and Things Seen. By J. Y. Buchanan, M.A., F.R.S. Medium 8vo. Pp. lvii+435. Cambridge: University Press, 1919. *Price* 21*s. net.*

The Nile Projects. By Sir William Willcocks, K.C.M.G. With 8 Appendices and 6 Plates. Medium 8vo. Pp. xxvi+184. Cairo, 1919.

[*Presented by the Author.*

In the Prison City: Brussels, 1914-1918. By J. H. Twells, Jr. Crown 8vo. Pp. 293. London: Andrew Melrose, Ltd., 1919. *Price* 5*s.*

Randers Fjords Naturhistorie. By A. C. Johansen. Demy 4to. Pp. 520. Copenhagen, 1918.

A Private in the Guards. By Stephen Graham. Crown 8vo. Pp. 356. London: Macmillan and Co., Ltd., 1919. *Price* 10*s. net.*

Modern China: A Political Study. By Shi-Gung Cheng, M.A., B.Sc. Demy 8vo. Pp. vii+380. Oxford: Clarendon Press, 1919. *Price* 6*s.* 6*d.*

The Mystery of Easter Island: the Story of an Expedition. By Mrs. Scoresby Routledge. Royal 8vo. Pp. xxi+404. London: Sifton Praed and Co., 1919. *Price* £1, 11*s.* 6*d.*

The Romantic Roussillon in the French Pyrenees. By Isabel Savory. Illustrated. Medium 8vo. Pp. xii+214. London: T. Fisher Unwin, 1919. *Price* 25*s.*

The Province of Saskatchewan, Canada: its Development and Opportunities. By F. H. Kitto. Ottawa: Department of the Interior, 1919. Pp. 153.

Spitsbergen: An Account of Exploration, Hunting, the Mineral Riches and the Future Potentialities of an Arctic Archipelago. With Illustrations and 3 Maps. By R. N. Rudmose Brown, D.Sc. Crown 8vo. Pp. 319. London: Seeley, Service and Co., Ltd., 1920. *Price 25s. net.*

Fields, Factories, and Workshops. By P. Kropotkin. Revised and enlarged Edition. Crown 8vo. Pp. xii + 477. Edinburgh: Thomas Nelson and Sons, 1919. *Price 2s. 6d. net.*

Alone in the Caribbean. By Fred. A. Fenger. Illustrated. Crown 8vo. Pp. xvii + 353. London: Hodder and Stoughton, 1919. *Price 12s. net.*

Samurai Trails. A Chronicle of Wanderings on the Japanese High Road. Demy 8vo. Pp. x + 296. London: Hodder and Stoughton, 1919. *Price 12s. net.*

Introductory Questions on African Ethnology. By George Foucart. Medium 8vo. Pp. xxxii + 159. Cairo: Sultanieh Geographical Society, 1919. *Price 5s. net.*

Spitsbergen: Terra Nullius. By R. N. Rudmose Brown. Pp. 11.

Report on the Administration of the Punjab and its Dependencies for 1917-18. Lahore, 1919. *Price 2s.*

Report on the Administration of the Madras Presidency for 1917-18. Madras, 1918. *Price 3s. 9d.*

Records of the Survey of India. Vol. viii. Parts i and ii. *Exploration in Tibet and Neighbouring Regions*, 1865-1879. By Col. Sir S. G. Burrard, K.C.S.I., R.E., F.R.S. Dehra Dun, 1915. *Price 5s. 4d. each part.*

The South and East African Year Book and Guide for 1919. With 24 Maps. Edited by A. Samler Brown, F.R.M.S., and G. Gordon Brown, F.R.G.S. 25th Edition. London: Sampson Low, Marston and Co., Ltd., 1919.

The Statesman's Year Book for 1919. Edited by Sir John Scott Keltie, LL.D., and M. Epstein, M.A. Pp. lii + 1476. *56th Annual Publication.* London: Macmillan and Co, Ltd., 1919. *Price 18s. net.*

Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1918. Vol. i. Pp. 697. London: Stationery Office, 1919. *Price 7s. net.*

Official Year Book of the Commonwealth of Australia; Statistics for Period 1901-1917. No. 11. By G. H. Knibbs, C.M.G. Melbourne, 1918.

Trade and Customs and Excise Revenue of the Commonwealth of Australia for the Year 1917-18. Prepared by G. H. Knibbs, C.M.G. Melbourne, 1919.

Forests of British Columbia. By H. N. Whitford, Ph.D., and Roland D. Craig, F.E. Ottawa, 1918.

Report of the Librarian of Congress and Report of the Superintendent of the Library Building and Grounds, 1918. Washington.

Shahabad District Gazetteer. B. vol. *Statistics*, 1900-1901 *to* 1910-1911. Patna, 1918 *Price 1s. 2d.*

Russian Almanac, 1919. Edited by N. Peacock. Pp. 210. London: Eyre and Spottiswoode, 1919. *Price 5s. net.*

Svenska Turistforeningens. Arjskrift, 1919.

A List of Atlases and Maps applicable to the World War. Compiled under the direction of Philip Lee Phillips. Pp. 202. Washington: Government Printing Office, 1918.

Colonial Reports (Annual).—Gold Coast (998). 1919. *Price 3d.*

Edinburgh University Calendar, 1919-1920. Pp. 922. Edinburgh: James Thin, 1919. *Price 5s.*

Report on the Administration of Bihar and Orissa, 1917-1918. *Price 7s. 6d.*

Year Book of the Norwegian Club, 1918-1919. Pp. 54.

Survey of India, General Report, 1917-1918. Prepared by Colonel Sir S. G. Burrard, K.C.S.I., R.E., F.R.S. Calcutta, 1919. *Price* 2*s.* 8*d.*

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

REPORT OF COUNCIL.

Thirty-Fifth Session, 1918-1919

(*1st October* 1918 *to* 30*th September* 1919).

The Council have the honour to submit the following Report :—

Ordinary Membership.

The changes which occurred during the Session in the number of members were as follows :—

Number on 1st October 1918,		1303
New Members added,		48
Members rejoined,		49
		1400
Deduct by Death,	52	
„ Resignation,	33	
„ Arrears,	6	
		91
Number of ordinary members remaining on the roll on 30th September 1919,		1309

Of this number, 706 are on the Edinburgh list, 306 on the Glasgow list, 112 and 80 on the Dundee and Aberdeen lists respectively. In addition to those on the lists named, 29 members reside abroad, and 76 reside in England. The number of Life members in the total given above is 188.

Teacher Associate Members.

Number on 1st October 1918,		152
New Members added,		42
		194
Deduct by Death,	1	
Deduct by Resignation,	3	
		4
Remaining on roll 30th September 1919,		190

The number of Associate Members at the various centres are as follows :— Edinburgh, 66 ; Glasgow, 79 ; Dundee, 2 ; Aberdeen, 11. In addition 30 reside in England and 2 abroad.

Fellows and Honorary Members.

There are seven Honorary Members, thirty-one Honorary Fellows, and ninety Ordinary Fellows of the Society, and thirty-seven Honorary Corresponding Members.

The Diploma of Fellowship was granted during the session to Mrs. S. Green Thompson, Mr. Michael C. Andrews, and Mr. Harry R. G. Inglis.

Meetings of the Society.

Twenty ordinary meetings of the Society were held, five at each of the Edinburgh, Dundee, Aberdeen and Glasgow centres. These meetings were addressed by the Right Hon. Sir Thomas Mackenzie, K.C.M.G., Very Rev. Principal Sir George Adam Smith, Rev. Canon J. T. Parfit, Lieut.-Col. H. S. L. Winterbotham, C.M.G., D.S.O., R.E., and Mrs Mary Gaunt.

Society's Medals.

The Society's Gold Medal was awarded to the Right Hon. Field-Marshal Earl Haig of Bemersyde, K.T., K.C.B., in recognition of his distinguished services to the state and empire.

The Society's Silver Medal was awarded to William F. Gillies, first in the merit list in the ordinary class in Geography in Edinburgh University.

The Library and Map Department.

During the past session 192 books, 53 pamphlets, 115 reports, 11 atlases, 298 map-sheets and charts have been added to the Library. The transactions and periodicals regularly received number 148. The number of volumes borrowed by members was 2090, and the library was, as usual, much consulted by others in search of geographical information.

The Council desire to record their thanks to the Foreign and Colonial Governments for the official publications they have presented to the Library; to the Treasury, for the revised Ordnance Survey maps of Scotland, both in outline and colour, as each of the revisions now in progress is published; to the Geological Survey of Scotland; to the Geographical Section, General Staff, War Office; to the Admiralty; to the British Museum Natural History; to the Edinburgh University Library; to the Survey of India; and also to the under-mentioned private donors of books and maps, viz.:—Sir Charles Warren, G.C.M.G., K.C.B.; Captain John Bartholomew, M.C.; Professor James Ritchie; Sir Charles Bruce, G.C.M.G.; Dr. J. G. Bartholomew; Professor J. Cvijic; Professor F. Noel; Mr. T. W. Balch; Dr. J. Percival Day; Professor Emmanuel de Margerie; Mr. Ralph Richardson, W.S.; Dr. Keppie Paterson; Mr. W. Westergaard, Ph.D.; Mr. E. W. Chalmers Kearney and Professor Giuseppe Ricchieri.

The Scottish Geographical Magazine.

Despite the coming of peace, printing costs have shown a continued tendency to increase, and the difficulties connected with the publication of the *Magazine* have been considerable during the year. It has nevertheless been published regularly throughout, and the editors have endeavoured to preserve a just balance between papers dealing with the new problems raised by the decisions of the Peace Congress and those which discuss general geographical topics or present the results of research.

The Council desire to acknowledge their obligations to the contributors of articles, and to the following, who have rendered valuable assistance to the editors :—Dr. J. G. Bartholomew ; Mr. J. H. Birrell ; Dr. W. S. Bruce ; Mr. H. M. Cadell ; Mr. G. G. Chisholm ; Dr. John Gunn ; Mr. L. Hinxman ; Dr. C. G. Knott ; Mr. John Mathieson ; Mr. J. D. Monro ; Rev. Dr. Morrison ; Dr. F. Mort ; Mr. R. C. Mossman ; Mr. T. S. Muir ; Mr. C. T. Macgregor ; Rev. R. Mackenzie ; Mr. Harold Raeburn ; Mr. Ralph Richardson ; Dr. W. G. Smith ; Prof. J. A. Thomson ; and Mr. W. B. Wilson.

National Collection of Old Maps of Scotland.

The Committee in charge of the formation of the National Collection of Old Maps of Scotland has this year concentrated its efforts in the work of tabulating the Plans of Edinburgh, and with the generous help of Charles Green, Esq. of Gracemount, and William Cowan, Esq., were able to exhibit in April the most complete chronological set of views and maps of Edinburgh ever brought together. The Exhibition was most successful, and much appreciated by citizens who never before had the opportunity of seeing a cartographic representation of the gradual development of the city. Later on the Committee undertook the work of reproducing the more representative of these views and maps in permanent form, and are now issuing the bound volume of Plans, practically showing the changes in Edinburgh every twenty-five years up to 1852, when the Ordnance Survey was published. The process of reproduction was much handicapped by the difficulty in obtaining unfaded original maps, as, in the course of time, practically all the maps were turning yellow with age, and the work of photographing merely accentuated every defect. It is believed that in course of time the Committee will have, in the Society's Rooms, the most complete collection ever accomplished. The thanks of the Committee are also due to Dr. Bartholomew for his handsome and generous donation of a Map of Edinburgh, illustrating in colour the dates of the chief buildings, streets and suburbs, showing at a glance the period of its erection.

Finance.

The Annual Financial Statement here follows.

ABSTRACT OF THE ACCOUNTS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

From 30th September 1918 *to 30th September* 1919.

FUNDS AT 30TH SEPTEMBER 1918 :—						
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50 (Deposited with Treasury), cost,				£405	1	0
£1777, 7s. 7d. —5 War Stock 1929-47, cost,				1686	7	6
£100 —5 Exchequer Bonds, due 1st April 1922,				100	0	0
				£2191	8	6
BALANCES due by Banks :—						
On Account Current,		£299	9 0			
On Deposit Receipt,		22	10 0			
On Do. do. (Glasgow Equipment Fund)		71	15 1			
				393	14	1
				£2585	2	7
Less—Subscriptions received in advance,		£11	11 0			
Entrance Fee do.,		1	1 0			
Due to Treasurer,		12	9 10			
				25	1	10
				£2560	0	9
SUBSCRIPTIONS from Ordinary Members,		£1245	1 0			
Less—Paid in Advance,		15	15 0			
		£1229	9 0			
SUBSCRIPTIONS from Associate Members, less paid in advance, £1, 1s.,		95	0 6			
DIPLOMA AND LIFE MEMBERSHIP FEES,		66	11 0			
DIVIDENDS and INTERESTS,		119	19 7			
GOVERNMENT GRANT,		200	0 0			
INCOME TAX recovered for year ending 5th April 1919,		4	16 0			
ENTRANCE FEES from new Members,		38	17 0			
				1754	13	1
INTEREST ON DEPOSIT RECEIPT (Glasgow Equipment Fund),				6	11	10
DONATIONS,				360	17	0
				£4682	2	8

MAGAZINE—Expenses of Publication, etc. :—						
Printing and other charges,				£1005	16	2
Illustrations,				40	1	0
Maps,				27	13	11
				£1073	11	1
Less—Magazines sold,	£68	2 1				
Advertising Receipts,	71	6 9				
				139	8	10
				£934	2	3
GENERAL PRINTING and STATIONERY,				116	15	8
BOOKS and other furnishings for Library,				20	4	5
EXPENSES in connection with Lectures—*Less* Lecture Tickets sold,				235	15	9
GLASGOW BRANCH, Rent of Room,				15	0	0
RENT OF COUNCIL ROOM, Taxes, Gas, Repairs, Insurance, etc.,				211	7	7
SALARIES,				594	10	6
MISCELLANEOUS, including General Expenses, and Postages,				36	1	6
MEDALS,				2	0	0
				£2165	17	8

FUNDS AT 30TH SEPTEMBER 1919:						
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50 (Deposited with Treasury), cost,			£405	1	0	
£1777, 7s. 7d. 5 War Stock, 1929-47, cost,			1686	7	6	
£100 —5 Exchequer Bonds, due 1st April 1922,			100	0	0	
			£2191	8	6	
BALANCES due by Banks :—						
On Account Current,	£245	5 5				
On Deposit Receipt,	322	10 0				
On do. do. (Glasg. Equipment Fund),	78	6 11				
			646	2	4	
			£2837	10	10	
Less—Subscriptions received in advance,	£16	16 0				
Sundry Creditors,	178	3 4				
Due to Treasurer,	126	6 6				
			321	5	10	
			2516	5	0	
			£4682	2	8	

Edinburgh, 15th October 1919.—I have examined the Accounts of the Royal Scottish Geographical Society for the year ended 30th September 1919, of which the above is an Abstract, and compared them with the Vouchers and Instructions thereof, and I find the whole to be correctly stated and sufficiently vouched and instructed.

P. C. ROBERTSON, M.A., C.A., Auditor.

LIVINGSTONE MEDAL FUND.

FUNDS AT 30TH SEPTEMBER 1918:—			
£572, 12s. 5d. 5% War Stock 1929-47, cost,		£543	19 10
Deposit Receipt Commercial Bank of Scotland, Limited,		131	8 5
		£675	8 3
INCOME RECEIVED:—			
Interest on £572, 12s. 5d., 5% War Stock 1929-47 untaxed,	£28 12 8		
Bank Interest,	3 15 11		
		32	8 7
		£707	16 10

FUNDS AT 30TH SEPTEMBER 1919:—			
£572, 12s. 5d.—5% War Stock 1929-47, cost,		£543	19 10
Deposit Receipt Commercial Bank of Scotland, Ltd.,		135	4 4
Balance due by Treasurer,		28	12 8
		£707	16 10

Edinburgh, 15th October 1919.—Examined and found correct.

P. C. ROBERTSON, M.A., C.A., Auditor.

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